S-30th May, 2015 AC after Circulars from Circular No.1 & onwards   - 6 -

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY

CIRCULAR NO.ACAD/SU/Sci./B.Sc. & M.Sc. Syll./5/2015

It is hereby notified for information to all the concerned that, on the recommendation of the Faculty of Science the Academic Council at its meeting held on 30-05-2015 has accepted the **revised semester-wise syllabi** as mentioned against their names in the Faculty of Science as under :-

Sr. No.	Name of the Subject	Semester
[1]	B.Sc. Computer Science Degree Course	III & IV
[2]	B.Sc. Information Technology Degree Course	III & IV
[3]	B.C.A. Science Degree Course	III & IV
[4]	B.Sc. Animation Degree Course	III & IV
[5]	B.Sc. Bioinformatics Degree Course	III & IV
[6]	B.Sc. Computer Science [Optional]	III & IV
[7]	B.Sc. Information Technology [Optional]	III & IV
[8]	B.Sc. Computer Applications [Optional]	III & IV
[9]	B.Sc. Computer Maintenance [Optional]	III & IV
[10]	B.Sc. Environmental Science [Optional]	V & VI
[11]	B.Sc. Bio-Chemistry [Optional]	V & VI
[12]	B.Sc. Forensic Science Degree Course	V & VI
[13]	B.Sc. Industrial Chemistry [Optional]	V & VI
[14]	B.Sc. Electronics [Optional]	V & VI
[15]	B.Sc. Zoology [Optional]	V & VI
[16]	B.Sc. Microbiology [Optional]	V & VI
[17]	B.Sc. Instrumentation Practice [Optional]	V & VI
[18]	B.Sc. Statistics [Optional]	V & VI
[19]	B.A. Statistics [Optional]	V & VI
[20]	B.A. / B.Sc. Mathematics [Optional]	V & VI
[21]	B.Sc. Home Science Degree Course	V & VI
[22]	B.Sc. Textile Interior Decoration Degree Course	V & VI
[23]	B.Sc. Fishery Science [Optional]	V & VI
[24]	B.Sc. Dairy Science & Technology [Optional]	V & VI
[25]	B.Sc. Botany [Optional]	V & VI
[26]	B.Sc. Physics [Optional]	V & VI
[27]	M.Sc. Computer Science	III & IV
[28]	M.Sc. I.T.	III & IV

This is effective from the Academic Year 2015-16 & onwards as appended herewith.

All concerned are requested to note the contents of the circular and bring the notice to the students, teachers and staff for their information and necessary action.

University Campus,
Aurangabad-431 004.
REF.NO.ACAD/SU/SCI./
        2015/3761-4160
Date:- 16-06-2015.

Director,
Board of College and
University Development.

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Copy forwarded with compliments to:-

1] The Principals, affiliated concerned colleges,
    Dr. Babasaheb Ambedkar Marathwada University

Copy to :-

1] The Controller of Examinations,
2] The Director, [E-Suvidha Kendra], in-front of Registrar's Quarter,
    Dr. Babasaheb Ambedkar Marathwada University,
3] The Superintendent, [B.Sc. Unit],
4] The Superintendent, [M.Sc. Unit],
5] The Programmer [Computer Unit-1] Examinations,
6] The Programmer [Computer Unit-2] Examinations,
7] The Record Keeper.

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B.Sc. (Computer Science)
Semester -III & IV

Three year Degree Course

(effective from 2015-16)

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

Curriculum Structure and Scheme of Evaluation: B.Sc.(C.S.)

Sr. No.	Paper Number	Name of the Paper Titles	Scheme of Teaching	Scheme of Evaluation(Marks)		
			Theory / Practical (Lect. /week)	Theory / Practical (Marks)	Exam Duration (in hrs.)	Total Marks
I Semester						
1	CS101-T	Computer Fundamentals	3	50	2	50
2	CS102-T	Digital Electronics	3	50	2	50
3	CS103-T	Microprocessor - I	3	50	2	50
4	CS104-T	C Programming – I	3	50	2	50
5	CS105-T	Communication Skill – I	3	50	2	50
6	CS106-T	Mathematical Foundation	3	50	2	50
7	CS107-P	Office Suite	4	50	2	50
8		C Programming – I	4	50	2	50
9	CS108-P	Microprocessor – I	4	50	2	50
10		Digital Electronics	4	50	2	50
II Semester						
1	CS201-T	Data Structure	3	50	2	50
2	CS202-T	Operating System	3	50	2	50
3	CS203-T	Microprocessor – II	3	50	2	50
4	CS204-T	C Programming – II	3	50	2	50
5	CS205-T	Communication Skill – II	3	50	2	50
6	CS206-T	Numerical Computation Methods	3	50	2	50
7	CS207-P	Data Structure	4	50	2	50
8		Microprocessor – II	4	50	2	50
9	CS208-P	C Programming – II	4	50	2	50
10		Numerical Comp. Methods	4	50	2	50

Sr. No.	Paper Number	Name of the Paper Titles	Scheme of Teaching	Scheme of Evaluation(Marks)		
			Theory / Practical (Lect. / week)	Theory / Practical (Marks)	Exam Duration (in hrs.)	Total Marks
III Semester						
1	CS301-T	Advance Data Structure	3	50	2	50
2	CS302-T	Unix Operating System	3	50	2	50
3	CS303-T	PC Maintenance	3	50	2	50
4	CS304-T	Programming in CPP	3	50	2	50
5	CS305-T	Database Management System	3	50	2	50
6	CS306-T	Statistical Method	3	50	2	50
7	CS307-P	Data Structure using CPP	4	100	2	100
8		DBMS	4		2	
9	CS308-P	PC Maintenance	4	100	2	100
10		Unix	4		2	

Sr. No.	Paper Number	Name of the Paper Titles	Theory / Practical (Lect. / week)	Theory / Practical (Marks)	Exam Duration (in hrs.)	Total Marks
IV Semester						
1	CS401-T	Software Engg.	3	50	2	50
2	CS402-T	Fedora	3	50	2	50
3	CS403-T	Basic of Networking	3	50	2	50
4	CS404-T	Core Java	3	50	2	50
5	CS405-T	Adv. DBMS	3	50	2	50
6	CS406-T	Web Fundamental	3	50	2	50
7	CS407-P	Java in Fedora OS	4	100	2	100
8		Web Funda	4		2	
9	CS408-P	Based in Adv. DBMS and N/w	4	100	2	100
10		Mini Project	4		2	

Course: B.Sc.(C.S.)	Semester : III
Topic: Advanced Data Structure	Paper No.: CS301-T

1   Unit – I Binary Trees

Representing Binary, Trees in Memory, Traversing Binary Trees, Traversal Algorithms using Stacks, Header Nodes; Threads, Binary Search Trees Searching and Inserting in Binary Search Trees, Deleting in Binary Search Tree, AVL Search Trees, Insertion in an AVL Search Tree, Deletion in an AVL Search Tree,

2   Unit – II Graph Theory

Terminology, Sequential Representation of Graphs; Adjacency matrix, Path Matrix, Warshall's Algorithm, Shortest Paths, Linked Representation of a Graph, Operations on Graphs, Traversing a Graph, Posets; Topological Sorting.

3   Unit – III Searching & Sorting:

Introduction, Sorting, Insertion sort, Selection sort, Merging, Merge-Sort, Radix Sort, Searching and Data Modification, Hashing.

Assignment:

Question to be solved from supplementary problems from the core reference book recommended below: 7.1, 7.2, 7.3, 7.4, 7.9, 8.1, 8.5, and 8.6.

Core References:

1. Data Structures: By Seymour Lipschutz, Tata Mcgraw- Hill Publication.

Advance Reference:

1. Fundamentals of Data structures, by Horowitz and Sahani (Galgotia publications).

2. An introduction to data structures and application, by Jean Paul Tremblay & Pal G. Sorenson (McGraw Hill).

3. Data Structures, by Tannenbaum, (PHI).

Course: B.Sc.(C.S.)   Semester : III

Topic: Unix Operating System   Paper No.: CS302-T

1   **Unit – I**

Overview of UNIX Operating System, basic features of Unix operating System, File Structure, CPU Scheduling, Memory Management, File System Implementation of Operating System Functions in UNIX.

2   **Unit – II**

Basic commands ls, cat, cal, date, calendar, who, printf, tty, sty, uname, passwd, echo, tput, bc, script, spell and ispell,. Files and Directories, File permission, Basic Operation on Files, Changing Permission Modes, Standard files

3   **Unit – III**

Introduction to Shell Scripting, Shell Scripts, read, Command Line Arguments, Exit Status of a Command, The Logical Operators && and ||, exit, if, and case conditions, expr, sleep and wait, while, until, for, $, @, redirection. The here document, set, trap, Sample Validation and Data Entry Scripts.

Define system Administration, Booting the system, Maintaining User Accounts, File System, and special files, Backup and Restoration

TEXT BOOKS:

1. Unix the ultimate guide, Sumitabha Das, TMH.

REFERENCES:

1. Advanced programming in the Unix environment, W.R.Stevens, Pearson education.
2. Unix system programming using C++, T.Chan, PHI.
3. Unix programming environment, Kernighan and Pike, PHI. / Pearson Education
4. Unix Internals The New Frontiers, U.Vahalia, Pearson Education.
5. Unix for programmers and users, 3rd edition, Graham Glass, King Ables, Pearson Education.

Course: B.Sc.(C.S.)	Semester : III
Topic: P.C. Maintenance	Paper No.: CS303-T

1   Unit – I:PC Architecture:

Chassis/Case, Baby, Desktop, Tower Cases. Power Supplies, power connectors, mounting points. Motherboard, form factors, expansion/bus slots, CPU, RAM, BIOS, Chipset, motherboard ports and Controllers.

Video System, video controllers, resolution, video memory, Video Drives, IDE drive, SCSI controllers, CD Drive, DVD Drive, Modems, Input devices and their drivers, USB architecture, USB Host Control types.

2   Unit – II: PC Assembly

Opening the System, Closing the System, Tips for working inside a PC, Mounting Motherboard in cabinet, installation of cards, devices and then connecting cables. Role of CMOS Entering CMOS setup, Basic CMOS Optimization, Hidden CMOS Settings.

3   Unit – III: Software Installation

Operating System installation, Windows, Unix, Linux, Device driver Installation, Creating users, giving rights to user, Network setting of a PC, shearing files and devices on network. Installing Antivirus, Antivirus settings updating (Quick Heal/ Netprotector)

Introduction to Laptop: System Features, Laptop components, Processors, Motherboards, memory, power, expansion bus, hard disk & removable storage devices

Books:

1) Troubleshooting, Maintaining & Repairing PCs by Stephen J. Bigelow, Tata McGraw-Hill.
2) The Complete PC Upgrade and Maintenance Guide by Mark Minasi, BPB Publication
3) Fault Finding and Troubleshooting on Laptop.

Course: B.Sc.(C.S.)   Semester : III

Topic: Programming in C++   Paper No.: CS304-T

1   **Unit – I:Introduction of OOPs**

Procedural Vs Object Oriented Programming, Basic concepts of Object Oriented Programming, Class, Object, Data Abstraction, Encapsulation, Inheritance, Polymorphism, Dynamic Binding, Message Passing. Benefits and applications of OOP, History and overview of C++, C++ program structure. Reference variables, Scope resolution operator, Member de-referencing operators, new and delete, cin and cout, The endl and setw manipulator.

Functions in C++:

Function prototype, Call by reference (using reference variable), Return by reference, Inline function, Default arguments, Const arguments.

2   **Unit – II: Function overloading:**

Different numbers and different kinds of arguments,

Objects and Classes:

Specifying a class, private and public, Defining member functions, Nesting of member function, Object as data types, Memory allocation for objects, static data members and member functions. Array of objects, Objects as function argument, returning objects, Friend function and its characteristics.

3   **Unit – III:Constructors and Destructors:**

Introduction, default and parameterized constructors, Multiple constructors in a class, Copy Constructor, Destructors

Operator Overloading:

Overloading unary operators, Rules for operator overloading, Overloading without friend function and using friend function, Overloading binary operators such as arithmetic and relational operators, Concatenating Strings, Comparison operators.

Reference Books:

1. Object Oriented Programming with C++ E. Balagurusamy, Tata McGraw-Hill Publishing

2. Object Oriented Programming In C + + Robert Lafore, Galgotia

3. Let us C++ YeshwantKanetkar; bpb publication

Course: B.Sc.(C.S.)   **Semester : III**

Topic: Database Management System   **Paper No.: CS305-T**

1   **Unit – I: Basic Concept**
- Data Definition, Types of Data, Record and File, File based System & Processing
- Database System Application, Purpose of Database System
- Abstraction & Data Integration
- Three level Architecture proposal for a DBMS.
- Component of a DBMS: Users, Facilities &Structure.
- Advantageous & Disadvantageous of DBMS.

Data Modeling & Design
- Data Association – Entities , Attributes & Association, Relationship among Entities, Representation of Association & Relationships
- Data Model: Importance of Data Model, Types of Data Model: Relational, E-R, Semi-structured, Object-Oriented, Network & Hierarchical Data Model. Advantageous & Disadvantageous of above model.

2   **Unit – II: Entity-Relationship Data Model**
- Entity , Entity Set, Types of Entities, Strong & Weak Entity, Representation
- Attribute, Types of Attributes , Representation
- Relationship : Binary & Ternary , Representation
- Mapping Cardinality, Entity-Relationship Design Issues

Relational Data Model
- Basic Structure of Relational Data Model, Database Schema
- Constraints : Integrity Rule 1 & 2
- Normal Form: Anomalies, Functional Dependency, Dependency Diagram, First Normal Form, Second Normal Form, Third Normal Form, Conversion from Universal to 1 NF, 1NF to 2 NF and 2NF to 3NF.

3   **Unit – III:Relational Algebra**
- Basic Operation – Union , Intersection, Difference and Cartesian Product
- Advance Operation- Projection, Selection, Join (Inner and Outer) & Division
- Examples based on above Operation.
- Relation Algebraic Queries.

Introduction to Oracle
- Oracle Software : Versions of Oracles, Products of Oracle, Tools of Oracle
- SQL: Logging to SQL/ iSQL, SQL plus worksheet.

Books:

1) Database System Concepts (Sixth Edition) AviSilberschatz, Henry F. Korth,S. Sudarshan
2) An Introduction to Database Systems byBipin C. Desai
3) Easy Oracle SQL: Get Started Fast Writing SQL Reports with SQL*Plus By John Garmany
4) Mastering Oracle SQL By Sanjay Mishra, Alan Beaulieu

Course: B.Sc.(C.S.)   Semester : III

Topic: Statistical Method   Paper No.: CS306-T

1   **Introduction and basic concepts of Statistics**
  - Definition of Statistics, Scope and importance of Statistics.
  - Primary and Secondary data, Types of data : qualitative, quantitative,
  - discrete, continuous, cross-section, time series, failure, industrial, directional data.
  - Graphical presentation: Histogram, frequency polygon, frequency
  - Curves Diagrammatic presentation: Bar diagrams, Pie diagram, scatter diagram.
  - Classification of data: Discrete and continuous frequency
  - distributions, inclusive and exclusive methods of classification,
  - relative and cumulative frequency distributions.

2   **Measures of Central Tendency**
  - Concept of central tendency. For group and Ungroup data
  - Arithmetic mean (A.M.) simple and weighted Merits and demerits of
  - A.M.,Mode: Computation for frequency and non-frequency data.
  - Computation of mode, Merits and demerits of mode. Median:
  - Computation for frequency and non-frequency data, computation.Merits& demerits of median.
  - Geometric mean (G.M.) computation for G M ,Merits demerits and
  - applications of G.M.Harmonic Mean (H M) computation for
  - frequency, non-frequency data, merits, demerits.

3   **Measures of Dispersions**
  - Dispersion and measures of Dispersion ,
  - Range (definitions and problems) Quartile Deviation (definitions and problems) Mean Deviation (definitions and problems) Standard Deviation (definitions and problems) Variance, different formulae for calculating Variance.

Books:

1. Fundamental of Mathematical Statistics By S.C.Gupta and V.K. Kapoor

Course: B.Sc.(C.S.)   **Semester : III**

Topic: Data Structure using C++   **Paper No.: CS307P (A)**

Minimum 10 Practicals to be performed as per the guidelines of teaching Faculty depending upon all theory units of concerned subject.

Course: B.Sc.(C.S.)   **Semester : III**

Topic: Database Management System   **Paper No.: CS307P(B)**

1) Design five schemas for any organization like: College, school, hospital, travel agency, company, bank etc.
2) Normalize the above five selected schemas as per 1NF,2NF and 3NF
3) Draw E-R Diagram for the same.
4) Solve atleast ten Relational Algebraic Queries

Course: B.Sc.(C.S.)   **Semester : III**

Topic: P.C. Maintenance   **Paper No.: CS308P(A)**

1. Identification of the various components inside the PC Cabinet.
2. Connecting Various device to PC
   a. Input Devices (Mouse, Keyboard, Scanner, Mic etc.)
   b. Output Devices (Monitor, Printers, Speakers, Head Phones, Projector etc.)
   c. Storage Devices (Pen Drive, Memory Cards, External HDD, etc.)
3. Connection of SMPS to Mother board and other components.
4. Mounting and dismounting of CMOS Battery, Processor, HDD, RAM, CD/DVD drive, Mother board
5. Making various BIOS settings like booting device sequence, enabling and disabling various ports, setting system time, date, max temperature etc.
6. Formatting HDD, creation of Partiations, Installation of Operating System, Creating Users setting rights to user,
7. shearing devices, sharing files and folders, accessing networking devices, Files and folders. Use of Disk clean up, disk defragmentation, installation of regional fonts.
8. Installation of device drivers for various devices.
9. Installation of Antivirus, installing it's updates and patches, it making various settings.
10. Assembly and Disassembly of Battery, CD/DVD, RAM, HDD etc. of Laptop.

Course: B.Sc.(C.S.)   **Semester : III**

Topic: Unix   **Paper No.: CS308P(B)**

Minimum 10 Practicals to be performed as per the guidelines of teaching Faculty depending upon all theory units of concerned subject.

Course: B.Sc.(C.S.)   Semester : IV

Topic: Software Engineering   Paper No.: CS401-T

1 **Unit I: Software and Software Engineering**

What is Software, Characteristics of software, categories of Software, attributes of WebApps, software Engineering, Software Process, Essence Software Engineering Practice, General Principles, Software Myths,

Software Process and Process Models

Software process Model Process Flow, Process Models, Waterfall model, Incremental Process Model, Evolutionary Process Models, Concurrent Models, Specialized Process Models, The Unified Process, Personal and Team Process Models, Product and Process

2 **Unit-II: Agile**

Introduction to Agility, Agility and the Cost of Change, Agile Process, Agility Principles, Human Factors, Extreme Programming (XP), XP Values, XP Process, Industrial, Critics of XP

Other Agile Process Models

Adaptive Software Development (ASD), Scrum, Dynamic Systems Development Method (DSDM), Crystal, Feature Driven Development (FDD), Lean Software Development (LSD), Agile Modeling (AM), Agile Unified Process (AUP)

3 **Unit III: Principles That Guide Practice**

Principles That Guide Process, Principles That Guide Practice, Communication Principles, Planning Principles, Modeling Principles, Construction Principles, Deployment Principles

Reference Books:

1. Software Engineering a Practitioner's Approach By Roger S. Pressman (Seventh Edition) McGraw Hill.

2. An Integrated Approach to Software Engineering, Pankaj Jalote, Narosa

Course: B.Sc.(C.S.)	Semester : IV
Topic: Fedora	Paper No.: CS402-T

1   Unit-I: Introduction to Fedora
- Basic concepts of Operating System, Kernel, Shell & File System structure
- Basic concepts of Linux
- What is Linux, Linux's Roots in Unix,Linux Features, Advantages of Linux.
- What is Fedora, Features of Fedora
- Installing Fedora
- Differences between CentOS, Red Hat Enterprise Linux & Fedora
- Basic commands of Linux
- Advanced Linux Commands

Introduction to Graphical Environment
- Logging to Fedora : Desktop : GNOME & KDE
- Differences between GNOME & KDE
- Features of GNOME & KDE
- Use and customize the GNOME interface
- Perform command tasks using the GNOME GUI
- Launch applications from command line & GNOME interface
- Customize X Window System

2   Software Package Administration
- Installing and deleting software packages
- Querying and updating software packages

User and Group Administration
- Creating and deleting users from the systems
- Modifying users profile
- Creating and deleting groups
- Important system files related to user administration

3   Advanced File Permissions
- Assigning advanced files permissions i.e. chmod, chown, chgrp & Sticky bit
- Creating, modifying and deleting ACL's

Disk Partitioning and Mounting File System
- Using fdisk, disk druid utilities for disk partitioning
- Using mkfs, commands to create file systems
- Mounting various file systems
- Auto mounting of file system

Books:

1. Bible Fedora 14

Course: B.Sc.(C.S.)   Semester : IV

Topic: Basic of Networking   Paper No.: CS403-T

1   Unit-I

Introduction

Communication System, Components of communication system, Compute network Advantages and applications of computer n/w. point-to-point an multipoint line configuration, LAN, MAN and WAN. Analog and Digita signals, Data Transmission: Parallel and Serial, Synchronous an Asynchronous transmission, Transmission Mode: Simplex, half-duplex an full-duplex.

Network Topologies

Mesh, Star, Tree, Bus and Ring and Hybrid Topology (Advantages and disadvantages of each)

2   Unit- II

Transmission media

Guided and unguided media, Twisted-pair, UTP and STP cable, coaxial cable, Optical Fiber cable, Radio waves, Microwaves, Satellite Communication (*Transmission characteristics and advantages of each type*)

Modulation & Multiplexing

Concept of modulation and demodulation, Digital-to-analog conversion, Amplitude Shift Keying (ASK)/AM, Frequency Shift Keying (FSK)/FM, Phase Shift keying (PSK)/PM.

3   Unit- III

THE MOBILE TELEPHONE SYSTEM:

First Generation(1G), Second Generation(2G), Third Generation(3G), Internet over cable, Spectrum Allocation, cable Modem, ADSL Versus Cable.

Reference Books:

1. Introduction to Digital and Data Communications, Michal A Miller, JAICO, publishing.

2. Data Communication and Networking: C.S.V. Murthy, Himalaya Publishing House

3. Data Communication and Networking :: Behrouz A. Forouzan; Mc-Graw Hill Pub.

4. Computer Networks by A. S. TANENBAUM, DAVID J. WETHERALL PRENTICE HALL Publication

Course: B.Sc.(C.S.)   **Semester : IV**

Topic: Core Java   **Paper No.: CS404-T**

1   **Unit-I: Object oriented paradigm**

Basic concepts of Object oriented programming: class & object, data abstraction and encapsulation, inheritance, polymorphism, dynamic binding, message communication. Benefits and applications of OOP. History and features of Java. Java Vs. C++. Java and Internet, Java and www. Java environment. Structure of java program, symbolic constants. Data types.

Arrays, Classes and Objects

Declaration and initialization, one and multidimensional arrays Defining a class, adding variables and methods, creating objects, static fields and static methods. Method overloading, Constructors: types and multiple constructors in class. Command line arguments.

2   **Unit-II: Inheritance**

Super and sub class, defining a subclass. Single inheritance, multilevel inheritance and hierarchical inheritance. Subclass constructors. Super keyword, Visibility controls, Method overriding, Dynamic method dispatch, Abstract methods and class.

Interfaces, String and Vector Class

Defining interfaces, implementing interfaces, extending interfaces, accessing interface variables. String class and its methods, Vectors

3   **Unit-III: Packages**

Introduction, Java API packages, Naming conventions, creating and accessing user defined package, using a package, adding a class to a package, importing classes from package.

Exception handling and Multithreading

Exceptions, syntax of exception handling code, multiple catch statements, throw: throwing own exceptions, throws and finally Introduction to multithreading, creating threads by extending the Thread class and by implementing Runnable interface, implementing the run() method, Life cycle of a thread, Thread methods and thread priority.

Books:

1. Prgramming with JAVA: E. Balagurusamy, Tata Mc-Graw Publishing Company Ltd.

2. The Complete Reference J2SE: Herbert Schildt, Tata Mc-GrawPub. Comp.Ltd.

3. Core Java-2 Vol-I &Vol-II - Cray S. Horstmann, Gray Corneel; Pearson Education, Low Price edition

Course: B.Sc.(C.S.)   Semester : IV

Topic: Advance Database Management System   Paper No.: CS405-T

1   **Unit – I: Structured Query Language**
    - DDL Statements to Create and Manage Tables using Create & Alter
    - Manipulating Data using Insert, Update & Delete Statement
    - Retrieving Data Using SQL Select, Restricting and Sorting Data, Using Single-Row functions, Conversion Functions and Conditional Expressions
    - Aggregated Data Using Group Function, Displaying data from Multiple tables, Sub queries, Set Operators

2   **Unit – II:Data Storage**
    - Overview of Physical Storage Media
    - Magnetic Disk
    - RAID
    - Tertiary Storage
    - Storage Access

    Database System Architecture
    - Centralized and Client-Server Architecture
    - Server System Architecture
    - Parallel System

3   **Unit – III:Transaction Processing**
    - Transaction Concept
    - Transaction State
    - Implementation of Atomicity and durability
    - Concurrent Execution

    Concurrency Control Techniques
    - Lock-Based Protocol
    - Timestamp-Based Protocol
    - Deadlock Handling

Books:

1) **Database System Concepts (Sixth Edition) AviSilberschatz, Henry F. Korth,S. Sudarshan**
2) **An Introduction to Database Systems byBipin C. Desai**
3) **Easy Oracle SQL: Get Started Fast Writing SQL Reports with SQL*Plus By John Garmany**
4) **Mastering Oracle SQL By Sanjay Mishra, Alan Beaulieu**

Course: B.Sc.(C.S.)	Semester : IV
Topic: Web Fundamental	Paper No.: CS406-T

1 **Unit-I: Introducing HTML5**
- Understanding HTML, XHTML, and HTML5, Introducing semantic markup, Syntax, Attributes, Working with elements, Creating an HTML document
- Embedding content, Embedding HTML by using inline frames, Working with hyperlinks, Adding images to your HTML document, Embedding plug-in content

Advances of HTML5
- HTML5 Layout container
- Format using <div> element
- Working with Tables: creating regular and irregular tables, heading, columns and rows, captions, header, footer.

2 **Unit-II:Introducing JavaScript**
- Basic of JavaScript
- JavaScript Variables, Operators & Its Precedence, Special Values,
- Predefined Built-Infunctions, Functions Declaration & Call
- String Functions
- Conditions and looping structure,
- Inline JavaScript & External JavaScript

Advances in JavaScript
- Object in JavaScript, Concept of array, how to use it in JavaScript, types of an array, array methods
- DOM Concept in JavaScript, DOM Objects, DOM Search Methods
- Event handling in JavaScript: Capturing & Bubbling, Subscribing, Unsubscribing and Cancelling Event, Windows Event, Keyboard and Mouse Events.

3 **Unit-III:Cascading Style Sheet**
- Introduction to CSS3
- Defining and Applying a Style, Inline, Embedded and External Style Sheet.
- Selectors: element, id and class selector, grouping selector, attribute,
- Specificity and cascading
- CSS properties: Color, box Model, border, padding, margin, float, clear

Books:

1) Programming in HTML5 with Javascript and CSS3 , Glenn Johnson (http://www.daoudisamir.com/references/vs_ebooks/html5_css3.pdf)
2) Beginning HTML5 andCSS3ByRichard Clark, OliStudholme,Christopher Murphy and DivyaManian.(http://www.alvinisd.net/cms/lib03/TX01001897/Centricity/Domain/10 77/beginning_html5_and_css3.pdf)
3) A Definitive Guide to HTML5 , By Adam Freemans

Course: B.Sc.(C.S.)   **Semester : IV**

Topic: Practical Based on Java in Fedora O.S.   **Paper No.: CS407P (A)**

Minimum 10 Practicals to be performed as per the guidelines of teaching Faculty depending upon all theory units of concerned subject.

Course: B.Sc.(C.S.)   **Semester : IV**

Topic: Practical Based on Web Fundamental   **Paper No.: CS407P(B)**

Exercise 1. Create a simple website by using Visual Studio Express

Exercise 2. Create additional pages

Exercise 3. Embedding Content

Exercise 4. Create a webpage using <table> and <div> elements

Exercise 5. Create a webpages using conditional and looping statements.

Exercise 6. Create a calculator webpage

Exercise 7. Create a Webpage to introduce National Bird/Animal/Emblem/Flower

Exercise 8. Learn more about positioning by adding more <div> elements to the webpage to define a header and footer for the page. Use CSS style rules to set the position.

Exercise 9. Learn more about CSS selectors by adding more elements to the page and try setting the format by selecting the elements without using an id.

Exercise 10. Learn more about colors by changing the color scheme, using RGB values.

Course: B.Sc.(C.S.)   Semester : IV

Topic: Practical Based on Adv. DBMS   Paper No.: CS408P(A)

1) Using SQL commands to create the tables and views of five schemas for any organization like: College, school, hospital, travel agency, company, bank etc.

2) Perform Data Definition Language Commands

3) Perform Data Manipulation Language Commands

4) Perform Minimum 10 Queries on each of the above five schemas.

Course: B.Sc.(C.S.)   Semester : IV

Topic: Mini Project Using VB.Net   Paper No.: CS408P(B)

Note:

1) It is expected that concerned Faculty is to introduce and make the students aware about the VB.Net in First Three-Four Practical before commencing of Mini-Project.

2) A mini project having minimum 5 forms, use VB.Net as a front end and any DBMS as backend. Team size maximum 2 students.

Minimum contents of Project Report

1. Introduction

2. Problem definition.

3. System Requirement Specification

    3.1. User Interview

    3.2. Current System flow diagram

    3.3. Proposed System.

4. E-R Diagram

5. DFD

6. Sample Screens

7. Conclusion