# Shree Manibhai Virani and Smt. Navalben Virani Science College, Rajkot
## (Autonomous)
## Affiliated to Saurashtra University, Rajkot

## Department of Computer Science & Information Technology
## BACHELOR OF COMPUTER APPLICATION (B.C.A.)

### SEMESTER - III

| 16UCACC10 | Core 6: Object Oriented Programming with JAVA | 4 hrs/wk | 4 Credits |
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**Objectives:**

To enable the students to

1. Understand the basic concepts and techniques of the object oriented programming paradigm
2. Learn the Java programming language: its syntax, idioms, patterns, and styles
3. Understand Inheritance and Polymorphism using Java
4. Understand concept of Exception handling and multiple threading with Java
5. Understand event driven Graphical User Interface (GUI) programming using Java

**Unit -1 Java Language Basics**                             **(10 hrs)**

- Basic Concepts of OOP
  - Class, Object, Inheritance, Encapsulation, Abstraction
- Difference between OOP and POP
- History and Features of Java
- Java Editions, Java Virtual Machine
- Language Building Blocks of Java
  - Comments, Keywords, Identifiers, Literals, Tokens, White spaces, Separator
- Data Types & Variables, Type Casting, Operators
- Decision Statements (if, switch), Looping Statements (for, while, do..While, foreach), Jumping Statements (break, continue, and return)
- Array, Command Line Argument Array
- Classes and Objects
  - Creating and using Class with members
  - Constructor, Constructor overloading
  - Use of finalize( ) method
  - Method Overloading
  - Static and Non-Static Members, VarArgs.

**Unit -2 Packages and Inheritance**                                    **(10 hrs)**

- Normal import and Static Import
- Introduction to Java API Packages and imp. Classes, java.lang Package Classes (Math, Wrapper Classes, String, String Buffer), java.util Package Classes (Scanner, Random, Date, GregorianCalendar, Vector, HashTable, StringTokenizer)
- Creating and Using User Defined package and sub-packages, Universal Class (Object Class)
- Concept of Inheritance
    - Types of Inheritance and types with Java
    - Access Specifiers (public, private, protected, default, private protected)
    - Constructors in inheritance with super keyword
- Method Overriding,
- Nested and Inner Class, Abstract and final keyword, Use of Interface.

**Unit – 3 Exception Handling, Multithreading and Streams**            **(10 hrs)**

- Types of Errors, Introduction to exception handling, Keywords: try, catch, finally, throw, throws, Creating user defined Exception
- Multithreading: Thread and its Life Cycle (Thread, States), Thread Class and its methods, Synchronization in Multiple Threads
- Stream and its types: Character, Byte, Reading and Writing through Byte Stream Classes, Character Stream Classes, Reading and Writing through Byte Stream Classes, Reading and Writing through java data types, use of StreamTokenzier and Random Access File.

**Unit – 4 Applet with Layouts Manager and AWT components: Applets**   **(10 hrs)**

- Introduction to Applet, Applet Life Cycle, Implement & Executing Applet with Parameters, Graphics class
- Layout Manager: FlowLayout, BorderLayout, CardLayout, GridLayout, GridBagLayout, BoxLayout, SprigLayout, GroupLayout, Using NO LAYOUT Manager
- AWT components (Button, Label, Checkbox, CheckboxGroup, Choice, List, TextField, TextArea, Scrollbar)
- AWT Containers: Frame and Panel

**Unit – 5 Event Handling and GUI using Swing**                         **(10 hrs)**
- Concept of Event Handling, Event Delegation Model, Event Packages, AWT Event Package, Event Classes, Listener Interfaces, Concept Adaptor Classes.
- Swing: Introduction to Swing, difference Between AWT and, Swing Components, Swing Container, Swing Event Package.

**Text Books**
1. *A. Balaguruswamy,* 1999, **Programming with JAVA A Primer**, McGraw Hill
2. *Naughton & Herbert Schildt,* **JAVA 2: The Complete Reference**, McGraw Hill

**Reference Books**

1. *Steven Holzner, 2005,* **JAVA 2 Black Book**, Dreamtech Press
2. *Khalid A. Mughal* , 2009, **A Programmer Guide to JAVA Certification**, Pearson Education
3. *Mitesh P. Mandaliya, Ms. Rupal B. Parekh*, Programming with JAVA, C. Jamnadas & Co.

| 16UCACC11 | Core 7:  RDBMS using Oracle | 04 hrs/wk | 4 Credits |
|---|---|---|---|

**Objectives:**

To enable the students to

1. Understand the basic concept of database
2. Building Entity Relationship Diagrams (ERDs) and mapping ERDs
3. Manipulate data in tables and create database objects
4. Analyze complex business scenarios, design and create databases using SQL
5. Create PL/SQL blocks of application code that can be shared by multiple forms, reports and data management applications
6. Describe stored procedures and functions
7. Explore the differences between SQL and PL/SQL and explore how PL/SQL is used to extend and automate SQL in administering the Oracle database

**Unit -1 Overview of DBMS, RDBMS and Understanding SQL          (10 hrs)**

- Introduction to DBMS, RDBMS Concept
- Importance of E.R Diagram in Relational DBMS
- Normalization
- Introduction to SQL
- SQL Datatypes
- Introduction to SQL*PLUS and its formatting commands
- Creating , Altering & Dropping Table Structures

**Unit -2 Managing Table and Accessing Data          (10 hrs)**

- Data Manipulation Commands like Insert, Update, Delete
- SELECT statement with WHERE, GROUP BY and HAVING, ORDER BY, DISTINCT,
- Special operator like IN, ANY, ALL, BETWEEN, LIKE, IS NULL
- JOINS (Inner join ,outer join, self join)
- Subquery (Single row subquery, multiple row subquery)
- Built in Functions
    - o Numeric Function
      Abs, ceil, decode, floor, round, mod, sqrt
    - o Character Function
      chr, concat, initcap, lower, upper, lpad, rpad, ltrim, replace,  rtrim, substr, instr, trim
    - o Date Function
      last_day, months_between, next_day, sysdate, systimestamp, to_date, to_char, to_number
    - o Aggregate functions
      SUM, COUNT, AVG, MAX, MIN

## Unit – 3 Understanding other SQL Objects, Data & Transactional Control Commands, and Concurrency Control using LOCKs                    (10 hrs)

- Other Database Objects:
  - View, Sequence, Synonym, Database Link, Index
- Grant, Revoke command
- Understanding Transaction and its commands: Commit, Rollback, Savepoint
- Understanding Locking Mechanism

## Unit – 4 PL/SQL                                               (10 hrs)

- PL/SQL Block Structure
- Control Structures:
  - Conditional Statement
  - Looping Statement
  - Sequential Statement
- %TYPE and %ROWTYPE
- Using Cursor(Implicit, Explicit)
- Exception Handling
- Creating and Using Procedure, Function
- Package
- Triggers
- Composite Data Types:
  - PL/SQL Tables, Nested Tables, Varrays

## Unit – 5 Oracle Architecture, Backup & Recovery               (10 hrs)

- Oracle Architecture
  - Physical Database Structure
  - Instance/Memory Architecture
  - Background Database Processes
- Creating & Altering Database
- Opening & shutdown Database
- Overview of Tablespace
- Oracle Blocks, Extent, Segments
- Import, Export
- SQL*Loader, NET8
- Overview of Backup & Recovery

**Text Books**
1. *Ivan Bayross,* **SQL, PL/SQL the programming Language of Oracle**, BPB Publications
2. *George Koch, Kevin Loney*, **Oracle 10g the Complete Reference**, Oracle Press and Tata MacGraw-Hill

**Reference Books**
1. *P.S. Deshpande*, 2006, **SQL and PL/SQL for Oracle 10g Black Book**, Dreamtech Press
2. *Ms. Falguni I. Parsana,* **RDBMS Using Oracle,** Bharat & Company, [ISBN : 978-93-81786-38-3]

| 16UCACC12 | Core 8: Operating System Concept with Unix/Linux | 04 hrs/wk | 4 Credits |
|---|---|---|---|

**Objectives:**

To enable the students to

1. Understand the basic concepts of operating system and Design algorithms of process and memory management
2. Understand the overview of Unix operating system and commands
3. Learn shell programming
4. Understand the overview of Linux configuration and features
5. Handling of Linux server administration

## Unit -1 Introduction                                                          (10 hrs)

- Meaning of OS
- Functions of OS
- OS Types
- Introduction of OS process
- Process State Transition Diagram
- Process Scheduling
    - FCFS, SJN, Round Robin, Priority Base Non Preemptive, Priority Base Preemptive
- Physical Memory and Virtual Memory
- Memory Allocation
    - Contiguous Memory Allocation
    - Non contiguous Memory Allocation
- Paging

## Unit -2 Getting Started with UNIX command                                     (10 hrs)

- Unix Architecture
- Unix Features
- Types of Shell (C, Bourn, Korn BASH)
- Unix File System,
- Unix File & Directory Permissions
- Connecting Unix Shell : Telnet
- Login Commands : passwd, logout, who, who am i, clear
- File / Directory Related Command : ls, cat, cd, pwd, mv, cp, ln, rm, rmdir, mkdir, umask, chmod, chown, chgrp, find, pg, more, less, head, tail, wc, touch
- Operators in Redirection & Piping
- Advance Tools
- Finding patterns in files : grep, fgrep, egrep
- Working with columns and fields : cut, paste, join
- Tools for sorting : sort, uniq
- Comparing files : cmp, comm., diff
- Changing information in files : tr, sed

- Examining file contents : od
- Tools for mathematical calculations : bc, factor
- Monitoring Input and Output : tee, script
- Tools for displaying date and time : cal, date
- Communications : telnet, wall, mtod, write, mail, news, finger
- Process related commands : ps
- command to run process in background : nice, kill, at, batch, cron, crontab, wait, sleep
- Concept of Mounting and DeMounting a File System
  - mount command, umount command

**Unit – 3 Shell Programming** (10 hrs)
- Introduction of vi editor
- Modes in vi
- various command
- Shell Keywords
- Shell Variables
- System variables\
  - PS2, PATH, HOME, LOGNAME, MAIL, IFS, SHELL, TERM, MAILCHECK
- User variables
  - set, unset and echo command with shell variables
- Positional Parameters
- Interactive shell script using read and echo
- Decision Statements
  - if then fi
  - if then else fi
  - if then elif else fi
  - case esac
- test command
- Logical Operators
- Looping statements
  - for loop
  - while loop
  - until loop
  - break, continue command
- Arithmetic in Shell script
- Various shell script examples

**Unit – 4 Getting Started with Linux** (10 hrs)
- Structure and Features of Linux
- Installation and Configuration of Linux - Using with Ubuntu
- Desktop Environment
- Creating Linux User Account and Password
- Install / Uninstall Software

**Unit – 5 Linux Admin (Ubuntu)**                                  **(10 hrs)**

- Installing and Managing Samba Server
- Installing and Managing Apache Server
- Optimizing LDAP Services
- Optimizing DNS Services
- Optimizing FTP Services
- Optimizing Web Services
- Configure Ubuntu's Built-In Firewall
- Working with WINE

**Text Books**

1. *Silberschatz, Galvin, Gagne*, 2009, **WileyOperating System Concepts:8th Edition Wiley Student Edition,** Wiley
2. *Yashavant P. Kanetkar*, 2003, **Unix Shell Programming**, BPB Publications

**Reference Books**

1. *Sumitabha Das*, 2006, **Unix concepts and applications,** McGraw Hill Education

| 16UCADA03 | DSE Allied 3: Web and M-Commerce Technologies | 04 hrs/wk | 4 Credits |
|---|---|---|---|

**Objectives:**

To enable the students to
1. Understand applications of mobile phones for various marketing disciplines
2. Understand the interrelationships between two media channels – mobile and social and how brands can engage consumers through these channels
3. Develop a strategic approach to define how mobile phones can be aligned and integrated into an overall marketing strategy in organizations
4. Establish a framework for corporate financial decisions
5. Understand major decisions, objective function of the firm and major tools available to fact the decision making process to achieve objective function of firm

**Unit -1 Electronic Commerce** (10 hrs)
- Traditional commerce and E-commerce, Internet and WWW, Role of WWW
- Value Chains, Strategic Business and Industry Value Chains, Role of E-commerce
- Evolution of E-commerce: Introduction, History of Electronic Commerce, Advantages and Disadvantage of E-commerce, Roadmap of e-commerce in India
- Web Based Tools for E-commerce – Security

**Unit -2 Introduction Mobile Commerce and Mobile Marketing** (10 hrs)
- What is mobile marketing and m-commerce?
- How does M-Commerce Work?
- Benefits of M-Commerce
- Infrastructure of M–Commerce, Types of Mobile Commerce Services
- Technologies of Wireless Business – Benefits and Limitations, Support, Mobile Marketing & Advertisement
- Differences between fixed Internet e-Commerce and m-Commerce

**Unit -3 Mobile Commerce: Technology & Security** (10 hrs)
- A Framework for The Study of Mobile Commerce – NTT Docomo's I-Mode
- Wireless devices for Mobile Commerce – Towards a classification framework for Mobile Location Based Services – Wireless Personal and Local Area Networks
- A managerial overview of 2G, 3G, 4G technologies
- A managerial overview of WiFi – Hifi - Lifi (IEEE802.11)
- Web Based Tools for E-commerce – Security

**Unit – 4 Mobile Commerce: Theory and Applications** (10 hrs)
- Mobile Portals, Mobile Infotainment Services, Mobile Ticketing, Mobile Banking, Mobile Advertising, Mobile e-Tailing, A Closer look at i-Mode and other successful services Mobilizing enterprise applications
- E–commerce in the Automotive Industry – Location– Based Services: Criteria for Adoption and Solution Deployment

- The role of mobile advertising in building a brand – M–commerce Business Models

**Unit – 5 Business– to– Business Mobile E– Commerce                    (10 hrs)**
- Enterprise Enablement – Email and Messaging – Field Force Automation (Insurance, Real Estate, Maintenance, Healthcare) – Field Sales Support (Content Access, Inventory) – Asset Tracking and Maintenance/Management – Remote IT Support
- Customer Retention (B2C Services, Financial, Special Deals) – Warehouse Automation – Security.

**Text Books**
1. *E.Brian Mennecke, J.Troy Strader,* 2003, **Mobile Commerce: Technology, Theory and Applications***,* Idea Group Inc., IRM press
2. *Ravi Kalakota, B.Andrew Whinston,* 2003*,* **Frontiers of Electronic Commerce***,* Pearson Education

**Reference Books**
1. *P. J. Louis*, 2001, **M-Commerce Crash Course***, McGraw- Hill Companies*
2. *Paul May,* 2001, **Mobile Commerce: Opportunities, Applications, and Technologies of Wireless Business**, Cambridge University Press March
3. *Norman Sadeh,* (2002), **M-Commerce, Technologies, Services and Business Models,** John Wiley & Sons

| 16UCACC13 | **Core Practical 5:** **Object Oriented Programming with JAVA  Practical** | **04 hrs/wk** | **02 Credits** |
|---|---|---|---|

- Practical based on JAVA Programming Language

| 16UCACC14 | **Core Practical 6 :** **RDBMS using Oracle Practical & Operating System Concept with Unix/Linux Practical** | **04 hrs/wk** | **02 Credits** |
|---|---|---|---|

- Practical based on Oracle
- Practical based on Unix/Linux

| 16UCACC15 | Core 9:<br>Programming with C#.NET | 04 hrs/wk | 4 Credits |
|---|---|---|---|

**Objectives:**

To enable the students to
1. Understand the .NET Framework
2. Understand the foundation of C# programming
3. Possess the understanding of OOP in C#.NET
4. Understand different application of ADO.NET
5. Design Crystal Reports and Create Setup of C# Application

**Unit -1 .NET Framework** (10 hrs)
- Introduction to .NET Framework Features / Advantages
- MS .NET Architecture
- Types of Projects in IDE (Console, Windows, Web, Setup, etc.)
- Components of the .NET Architecture:
  - Common Language Runtime
  - Common Type System
  - Common Language Specification
  - Base Class Library
  - CTS and CLS BCL / FCL CLR,JIT Compiler
  - Microsoft Intermediate Language
  - Managed/Unmanaged Code
  - Garbage Collection
  - Assembly
  - Namespaces

**Unit -2 C# Basics** (10 hrs)
- Basic Variables, Declaring Variables
- Data types in C#
- Creation of C#
- First simple Program
- Compilation and Execution
- Type Conversion and casting, Boxing and Unboxing
- Operators in C#
- Decision Making Statements (If-else, Switch)
- Looping (For, While, Do-while, For-each)
- Jumping statement (Break, Continue, Goto)
- Structure, Enumeration
- Arrays (One Dimensional, Rectangular, Jagged)
- Exception Handling

**Unit – 3 OOP** (10 hrs)

- Classes and Objects, Encapsulation and Polymorphism
- Access modifiers
- Methods and it's parameters (with "ref" and "out" parameters)
- Method Overloading, Overriding Methods
- Inheritance
- Sealed Class, Abstract Class and Interface
- Properties and Indexer, Delegates and Events

**Unit – 4 Working With GUI** (10 hrs)

- Different components (windows) of IDE
- Working with Forms Class
  - Loading, showing and hiding forms, Controlling One form within another, MDI Form.
- Message Box class with all types of Show () method
- Windows Form Controls.
- Standard Controls:
  - Textbox, Label, Button, List box
  - Combo box, Checkbox, Picture Box
  - Radio Button, Panel, Scroll-bar
  - Timer, Datetimepicker, Notify Icon
  - Image List, Link Label, List View
  - Tree View, Toolbar, Status Bar
  - OpenFileDialog, SaveFileDialog
  - Font Dialog, Color Dialog, Print Dialog
- Designing Menu's: Context Menu, Menu Strip, Status Strip, Tool Strip
- Adding Third Party Control in Toolbox

**Unit – 5 Database Programming With ADO.NET** (10 hrs)

- ADO.NET Architecture
- Connected and Disconnected Architecture
- Connected Architecture
  - Command
  - Data Reader
- Disconnected Architecture
  - Data Adapter
  - Dataset
  - data Table
  - Data Row
  - Data Column
  - Data Relation
  - Data View

- Data Binding
- Grid View Programming
- Creating Crystal Reports
- Types of Setup Projects
- Creating Setup Project
  - File System Editor
  - User Interface Editor
  - Launch Conditions Editor

**Text Books**
1. *Steven Holzner*, **C#.NET Programming Black Book**, dreamtech publications
2. *Rebecca M. Riordan,* **Microsoft ADO. Net** , Microsoft Press

**Reference Books**
1. **Introduction to .NET framework**, Wrox publication
2. **Programming with C#**, Bharat & Co. [ISBN : 978-93-81786-41-3]
3. **Programming with C#.net**, C. Jamnadas & Co. [ISBN : 978-93-81072-64-6]

| 16UCACC16 | Core 10:<br>Web Development using PHP | 04 hrs/wk | 4 Credits |
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**Objectives:**

To enable the students to
1. Understand the basic concepts of scripting language and web programming
2. Understand how to implement, dry-run and debug programs.
3. Recognize the benefits of using server side scripting
4. Become equipped to make good choices about model design and use of open source scripting PHP
5. Learn how to build and maintain php websites
6. Understand how to write php scripts and use webserver
7. Understand the concept of client-server architecture

**Unit -1 Introduction** (10 hrs)
- Introduction of webpages and website
- Static and Dynamic Web
- Client side & Server Side Scripting
- Webserver (IIS & Apache-XAMPP)
- HTTP & HTTPS protocol
- FTP
- Web Hosting, Virtual Host, Multi-Homing
- Distributed Web Server Overview,
- Document Root
- Introduction to PHP
- PHP configuration in IIS & Apache Web server
- Understanding of PHP.INI file
- Understanding of PHP.ht access file
- PHP Variable
  - Static & global variable
- GET , POST & REQUEST method
- PHP Operator
- Conditional Structure & Looping Structure

**Unit -2 Array and Function** (10 hrs)
- Array
- User Defined Functions:
  - argument function
  - default argument
  - variable function
  - return function
- Variable Length Argument Function
  - func_num_args
  - func_get_arg,

- o func_get_args
- Variable Function
  - o Gettype, settype, isset, unset,empty, strval, floatval, intval, print_r
- String Function
  - o Chr, ord, strtolower, strtoupper, strlen, ltrim, rtrim trim, substr, strcmp, strops, strrpos, strstr, str_replace, strrev, echo, print, explode(), implode(), md5(), substr_compare(), substr_count(), ucfirst(), ucwords()
- Math Function
  - o Abs, ceil, floor, round, fmod, min,
  - o max, pow, sqrt, rand, cos(),
  - o acos(), sin(), asin(), tan(), atan(),
  - o dechex(), is_finite(), is_infinite(),

- Date Function
  - o Date, getdate, setdate
  - o Checkdate, time, mktime
  - o date_add(), date_create()
  - o date_format(), gmdate()
  - o localtime(), strftime(), strptime(), strtotime()
- Miscellaneous Function
  - o define, constant, include,
  - o require, header, die, exit, GD Library

## Unit – 3 Handling Form and Files & Session tracking                     (10 hrs)
- Handling form with GET, POST & REQUEST
- Array Function
  - o Count, list, in_array, current,
  - o next, previous, end, each, sort,
  - o rsort, assort, arsort, array_merge,
  - o array_reverse, array_diff(),
  - o array_merge_recursive(),
  - o array_shift(), array_slice(),
  - o array_unique(), array_unshift(),
  - o array_keys(), array_key_exists(),
  - o array_push(), array_pop(),array_multisort(),array_search()
- Cookies
- Session
- Server variables
- PHP Regular expression.
- PHP file Uploading
- File handling Function
  - o fopen, fread, fwrite, fclose,
  - o file_exists, is_readable,
  - o is_writable, fgets, fgetc, file,

- o file_get_contents, fputcsv, fputs,
- o file_putcontents, ftell, fseek,
- o rewind, copy, unlink, rename,
- Sending mail using mail() using php mailer

## Unit – 4 Interacting with MySQLi                                    (10 hrs)
- Working with MySQLi using PhpMyAdmin
- PHP-MySQLi Connectivity and Debug functions
  - o mysqli_connect(), mysqli_set_charset()
  - o mysqli_character_set_name(), mysqli_select_db()
  - o mysqli_close(), mysqli_errno()
  - o mysqli_error_list(), mysqli_error()
  - o mysqli_connect_errno(), mysqli_connect_error()
  - o mysqli_get_charset(), mysqli_get_client_info()
  - o mysqli_get_client_version(), mysqli_get_host_info()
  - o mysqli_get_server_info(), mysqli_get_server_version() ,
  - o mysqli_debug()
- PHP-MySQLi Functions
  - o mysqli_affected_rows(), mysqli_autocommit()
  - o mysqli_commit(), mysqli_data_seek()
  - o mysqli_fetch_all(), mysqli_fetch_array()
  - o mysqli_fetch_assoc(), mysqli_fetch_fields()
  - o mysqli_fetch_object(), mysqli_fetch_row()
  - o mysqli_field_count(), mysqli_field_seek()
  - o mysqli_free_result(), mysqli_insert_id()
  - o mysqli_kill(), mysqli_multi_query()
  - o mysqli_num_fields(), mysqli_num_rows()
  - o mysqli_query(), mysqli_real_escape_string(),mysqli_rollback()

## Unit – 5 Advance PHP with OOPS                                    (10 hrs)
- PHP with OOPS
  - o Class,
  - o Constructor,
  - o Inheritance,
  - o Serialize objects
  - o Database Handling with OOPS
  - o Connection class using OOP
- PHP with AJAX
  - o What is AJAX?
  - o How AJAX Works with PHP
  - o Working with Ajax as Background Process
- JQuery
  - o What is JQuery?
  - o How JQuery Works and how it is created.
  - o Using JQuery with PHP and ajax

**Text Books**

1. *Ed Lecky-Thompson, Heow Eide-Goodman,* 2004, **Professional PHP5**, Wiley India Pvt. Ltd.
2. *Lynn Beighley*, Michael Morrison, 2009, **Head First PHP & MySQL (A Brain-Friendly Guide)**, O′Reilly

**Reference Books**
1. *David Powers*, 2013, **PHP Object-Oriented Solutions**, Apress
2. *Keith Wald, Jason Lengstorf*, 2016, **Pro PHP and jQuery**, Apress

| 16UCACC17 | Core 11: System Analysis & Design | 04 hrs/wk | 4 Credits |
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**Objectives:**

To enable the students to

1. Understand the basic concepts of system study and system analysis
2. Understand importance of each phase in System Development Life Cycle
3. Understand importance of Software Development Paradigm (Models)

**Unit -1 System Study and System Development Life Cycle** **(10 hrs)**

- System, System Types, System Characteristics, System Study, System Approach, Elements of System Analysis, Role and Attribute of System Analyst, Program Analyst, Designer, Information Analyst, Computer Based Information System. Why System Projects?
- System Development Life Cycle
  - Understanding Activities of Each Phase
  - Outcome and Deliverable with Document name of each phase
- Fact Finding Techniques.
- Understanding Concepts of UML and Designing charts (Class, User Case and Activity) based on it.

**Unit -2 Introduction of Software Engineering and Software Development Models**
                                                                                    **(10 hrs)**

- Software Engineering : A Layered Technology.
- Software Process and Software Process Models.
  - Waterfall Model
  - Iterative Model
  - V-Model
  - Spiral Model
  - Big Bang Model
  - Prototyping Model

**Unit -3 Computers Aided Software Engineering Tools in Project Management.**
    **(CASE tools)** **(10 hrs)**

- Drawing Data Flow Diagram using MS Visio.
- User Interface Flow Diagram.
- Concept of Project Management
- Function Point and LOC based Metrics.
- Concept of Project Scheduling and Tracking.
- Timeline chart and Pert chart in MS Project.

**Unit – 4 Software Quality Assurance and Testing**  (10 hrs)

- ISO and Six Sigma for Quality Assurance.
- Introduction to software Testing
  - Software faults and failures
  - Bug/Error/Defect/Faults/Failures
  - Testing Artifacts
  - Test case
  - Test Script
  - Test Plan
  - Test Harness
  - Test Suite
- Static Testing
  - Informal Review
  - Walkthrough
  - Technical Review
  - Inspection
- Dynamic Testing, Testing Levels and Techniques of each Level.
  - Level: Unit Testing, Integration and System Testing.
- Automated Testing using (any freeware or open source) software testing tools.

**Unit – 5 Case Study according to SDLC**  (10 hrs)

- Student has to prepare synopsis with deep study of system according to phase first, second and third of SDLC.
- Get approval of your Subject Teacher for your work.

**Text Books**

1. *Priyank Doshi,* **SAD, Software Quality Assurance and Testin**g, Bharat & Co. , [ISBN : 978-93-81786-36-9]
2. Roger S Pressman, **Software Engineering – A Practitioner's Approach**, McGraw Hill

**Reference Books**
3. *James A. Senn,* 2008, **Analysis & Design of Information System,** McGraw Hill
4. *Rajib Mall*, 2009, **Fundamentals of Software Engineering**, Prentice Hall India Learning Private Limited
5. *Jasson Roff*, 2003, **UML:A Beginner's Guide**, McGraw Hill

| 16UCADA04 | DSE Allied 4:<br>User Interface and User Experience<br>Practical | 4 hrs/wk | 2 Credits |
|---|---|---|---|

**Objectives:**

To enable the students to

1. Understand concepts, techniques, practices, workflows, and tools associated with the practice of user experience design in web and mobile experiences
2. Develop an appreciation for the use of storytelling as a means of designing and evaluating user experience
3. Use techniques for evaluate a user interface design
4. Prototyping, low-fidelity design, and implementation of first
5. Describe a proven, user-centric design framework that supports end-to-end usability involvement in web projects
6. Learn different methods for usability testing web sites and when to apply them

**Unit -1 UI & UX Introduction**                                     **(10 hrs)**

- What is User Interface?
- User interface design for the mobile app & web app
- Different Devices & Display size
- User Interaction with the products, applications and services – Cognitive Model/Mental Model
- Why User Experience Design
- What is User Experience (UX) Design?
- Core elements of User Experience. How these elements work together

**Unit -2 UI Design & UX Design Process**                          **(10 hrs)**

- Defining the UX Design Process and Methodology
- Wireframes, Personas, Mind-mapping, Mental models, Prototyping, Card sorting, Eye-tracking, Use cases, User profiling, Interaction design, Information architecture, Content writing, Customer journey maps, UX design and usability testing tools, Customer experience evaluation.

**Unit – 3 UX  Design Process: Research & Define &  Iterate/ Improve**     **(10 hrs)**

- Why Research is critical?
- Research methods and tools.
- Understanding the User Needs and Goals, Understanding the Business Goals
- Hands-on Practices different tools
- Understanding the Usability Test findings Applying the Usability Test feedback in improving  the design

### Unit – 4  UX  Design Process: Ideate/Design                                        (10 hrs)

- Visual Design Principles
- Information Design and Data Visualization
- Interaction Design Information Architecture
- Wire-framing & Story barding
- UI Elements and Widgets
- Screen Design and Layouts
- Hands-on Practices different tools

### Unit – 5 UX Design Process: Prototype & Test & Deliver                             (10 hrs)

- Why Test your Design?
- What is Usability Testing?
- Types of  Usability Testing
- Usability Testing Process
- How to prepare and plan for the Usability Tests?
- Prototype your Design to Test?
- Introduction of Prototyping tools
- How to conduct Usability Test?
- How to communicate Usability Test Results?
- Communication with implementation team UX Deliverables to be given to implementation team

**Text Books**
1. *Jesse James Garrett*, 2010, **The Elements of User Experience: User-Centred Design for the Web,** New Riders
2. *Elizabeth Goodman, Mike Kuniavsky, Andrea Moed*, 2012, **Observing the User Experience: A Practitioner's Guide to User Research**, Morgan Kaufmann
3. *Dorian Peters*, 2013, Interface **Design for Learning: Design Strategies for Learning Experiences (Voices That Matter)**, New Riders

**Reference Books**
1. *Emrah Yayici*, 2014, **UX Design and Usability Mentor Book: With Best Practice Business Analysis and User Interface Design Tips and Techniques**, Emrah Yayici
2. Jenifer Tidwell, 2011,**Designing Interfaces [2nd Edition]**, Shroff/O'Reilly

| 16UCACC18 | Core Practical 7: Programming with C#.NET Practical | 04 hrs/wk | 02 Credits |
|---|---|---|---|

- Practical based on  C#.NET

| 16UCACC19 | Core Practical 8: Web Development using PHP Practical | 04 hrs/wk | 02 Credits |
|---|---|---|---|

- Practical based on PHP