

**Anekant Education Society's**  
**Tuljaram Chaturchand College of Arts, Science and Commerce, Baramati.**  
**SYLLABUS STRUCTURE OF SYBBA (C.A)**  
**Bachelor of Business Administration (Computer Application)**  
**Syllabus (CBCS Pattern) under Academic Autonomy for the year 2023-2024**

**Semester -III**

<b>Subject Code</b>	<b>Name of Subject</b>	<b>Credit</b>
UBCA231	Java Programming	03
UBCA232A UBCA232B	Elective: PHP Node JS	03
UBCA233	Python Programming	03
UBCA234	Operating System Concepts	03
UBCA235	Business Statistics using R Programming	03
UBCA236	Computer Laboratory I [Based on UBCA231 & UBCA233]	02
UBCA237	Computer Laboratory II [Based on UBCA232 & UBCA235]	02
	Certificate Course	02
	Environmental Study (EVS)	02
Total		23

**Semester -IV**

<b>Subject Code</b>	<b>Name of Subject</b>	<b>Credit</b>
UBCA241	Advanced Java Programming	03
UBCA242A UBCA242B	Elective: Advanced PHP React JS	03
UBCA243	Mathematical Foundation for Computer Applications	03
UBCA244	Software Testing and Automation	03
UBCA245	Networking	03
UBCA246	Computer Laboratory I [Based on UBCA241 & UBCA 244]	02
UBCA247	Computer Laboratory II [Based on UBCA242 & UBCA 245]	02
	Project	04
Total		23

# SYLLABUS (CBCS) FOR S.Y.BBA (C.A.) (w. e. from June, 2023)

## Academic Year 2023-2024

Class : S.Y.BBA (C.A.) (Semester - III)

Paper Code : UBCA231

Title of Paper: Java Programming

Credit: 3

No. of. Lectures: 48

### A] Learning Objectives:

1. To learn the syntax and program structures in Java Programming.
2. To understand concepts of object-oriented programming in Java.
3. To learn Design and develop GUI applications using Abstract Windowing Toolkit (AWT), Swing and Event Handling.
4. To understand how to use programming in day-to-day applications.

### B] Learning Outcomes:

Student should be able to

1. Know the different basic concepts of Java programming language.
2. Use the Java programming language for various programming technologies
3. Develop Software in the Java programming language.

### Topics/Contents

#### Unit 1 Introduction to JAVA

(08L)

- 1.1 Features of Java
- 1.2 JDK Environment & tools like (java, javac, appletviewer, javadoc, jdb)
- 1.3 OOPs Concepts  
Class, Abstraction, Encapsulation, Inheritance, Polymorphism
- 1.4 Difference between C++ and JAVA
- 1.5 Structure of Java program
- 1.6 Data types, Variables, Operators, Keywords, Naming Convention
- 1.7 Decision Making (if, switch), Looping (for, while)
- 1.8 Type Casting
- 1.9 Array  
Creating an Array Types of Array

-One Dimensional Arrays

-Two Dimensional Arrays

### 1.10 String

- Arrays, Methods, StringBuffer Class

## **Unit 2: Classes and Objects**

**(10L)**

2.1 Creating Classes and Objects

2.2 Memory Allocation for Objects

2.3 Constructor

2.4 Implementation of InheritanceSimple, Multilevel,

2.5 Interfaces

2.6 Abstract Classes and Methods

2.7 Implementation of Polymorphism

2.8 Method Overloading, Method Overriding

2.9 Nested and Inner classes.

2.10 Modifiers and Access Control

2.11 Packages

    Packages Concept

    Creating User Defined Packages

2.12 Java Built in Packages

    java.lang->math

    java.util->Random, Date, Hashtable

2.13 Wrapper Classes

## **Unit 3 Collection**

**(10L)**

3.1 Collection Framework.

3.1.1 Interfaces

- Collection

- List

- Set

- SortedSet

- Enumeration

- Iterator

- ListIterator

3.1.2. Classes

- LinkedList

- ArrayList
- Vector
- HashSet
- TreeSet
- Hashtable

### 3.2 Working with Maps

#### 3.2.1 Map Interface

#### 3.2.2 Map Classes

- HashMap
- TreeMap

## **Unit 4 File and Exception Handling**

**(10L)**

### **Exception**

#### 4.1 Exception Types

#### 4.2 Using Try Catch and Multiple Catch

- Nested try, throw, throws and finally

#### 4.3 Creating User Defined Exceptions

### **File Handling**

#### 4.4 Stream

- Byte Stream Classes
- Character Stream Classes

#### 4.5 File IO basics

#### 4.6 File Operations

- Creating File
- Reading File (character, byte)
- Writing File (character, byte)

## **Unit 5: Applet, AWT and Swing Programming**

**(10L)**

#### 5.1 Introduction

#### 5.2 Types Applet

#### 5.3 Applet Life Cycle

- Creating Applet
- Applet tag

#### 5.4 Applet Classes

- Color

- Graphics

- Font

## **AWT**

5.5 Components and Container used in AWT

5.6 Layout Managers

5.7 Listeners and Adapter classes

5.8 Event Delegation Model

## **Swing**

5.9 Introduction to Swing Component and Container Classes

### **Reference Books:**

1. Programming with JAVA - E Balgurusamy
2. The Complete Reference – JAVA Herbert Schildt
3. The Java™ Programming Language- Ken Arnold, James Gosling, David Holmes, Addison Wesley, Fourth Edition
4. Core Java Volume I- Fundamentals, Cay S. Horstmann, Gary Cornell, Pearson India Education Services Pvt. Ltd., Eleventh Edition
5. Core Java An Integrated Approach (Black Book)-Dr. R. Nageswara Rao, dreamtech Press 2017 Edition
6. Head First Java - Kathy Sierra and Bert Bates, O'REILLY, Second Edition

### **Website Reference Link:**

1. <https://www.javatpoint.com/java-tutorial>
2. <https://www.geeksforgeeks.org/java>

### **Evaluation:**

<b>Internal Evaluation</b>	<b>External Evaluation</b>
Unite Test (20)	Fill in the blanks, One Sentence Answer (12)
Assignments/Performance/Attendance / Seminars (20)	Short Notes (12) Short Answers Que (12) Short Answers Que (12) Long Answer Questions (12)
<b>40</b>	<b>60</b>

# SYLLABUS (CBCS) FOR S.Y.BBA (C.A.) (w. e. from June, 2023)

## Academic Year 2023-2024

Class: S.Y.BBA (C.A.) (Semester - III)

Paper Code: UBCA232A

Title of Paper: PHP

Credit: 3

No. of. Lectures: 48

### A] Learning Objectives:

1. To understand how server-side programming works on the web
2. Using PHP built-in functions and creating custom functions
3. To understanding POST and GET in form submission.
4. How to receive and process form submission data
5. To Read and process data in a MySQL database

### B] Learning Outcomes:

1. Write PHP scripts to handle HTML forms.
2. Write regular expressions including modifiers, operators, and meta characters.
3. Create PHP programs that use various PHP library functions, and that manipulate files and directories.
4. Analyze and solve various database tasks using the PHP language
5. Analyze and solve common Web application tasks by writing PHP programs

### Topics/ Contents

#### Unit 1

#### PHP Basics

(07L)

- 1.1 Setting up a Development Environment
- 1.2 Variables, Numbers and Strings
- 1.3 Calculations with PHP
- 1.4 Using Arrays

<b>Unit 2</b>	<b>Control Structures and Loops</b>	<b>(06L)</b>
	2.1 Conditional Statements	
	2.2 Using Loops for Repetitive tasks	
	2.3 Combining Loops and Arrays	
<b>Unit 3</b>	<b>Functions, Objects and Errors</b>	<b>(07L)</b>
	3.1 PHP's Built-in functions	
	3.2 Creating Custom functions	
	3.3 Passing Values by Reference	
	3.4 Understanding Objects	
<b>Unit 4</b>	<b>Working with Forms</b>	<b>(07L)</b>
	4.1 Building a Form	
	4.2 Processing a Form's Data	
	4.3. Differences between POST and GET	
	4.4. Preserving User Input	
<b>Unit 5</b>	<b>More with Forms</b>	<b>(07L)</b>
	5.1 Dealing with checkboxes and radio buttons	
	5.2 Retrieving values from lists	
	5.3 Validating and restricting data	
	5.4 Sending Email	
<b>Unit 6</b>	<b>Storing and Protecting Data</b>	<b>(07L)</b>
	6.1 Setting and Reading Cookies	
	6.2 Protecting Online Files	
	6.3 Understanding Session Variables	
<b>Unit 7</b>	<b>MySQL Database Overview</b>	<b>(07L)</b>
	7.1 phpMyAdmin Overview	
	7.2 Using a MySQL Database	
	7.3 Reading and Writing Data	

### **References Book:**

1. Php: A Beginner's Guide 1st Edition McGraw-Hill Osborne Media; 1 edition by Vikram Vaswani
2. Murach's PHP and MySQL (2nd Edition) by Joel Murach and Ray Harris
3. PHP: The Complete Reference Paperback – 1 Jul 2017 by Steven Holzner (Author)
4. Programming PHP - Rasmus Lerdorf and Kevin Tatroe, O'Reilly publication
5. Beginning PHP 5 - Wrox publication
6. "Beginning PHP and MySQL From Novice to Professional" by W Jason Gilmore
7. "PHP Object - Oriented Solutions" by David Powers

### **Website Reference Link:**

1. <https://www.php.net/>
2. <https://www.w3schools.com/php/>
3. <https://www.tutorialspoint.com/php/index.htm>

### **Evaluation:**

<b>Internal Evaluation</b>	<b>External Evaluation</b>
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# **SYLLABUS (CBCS) FOR S.Y.BBA (C.A.) (w.e. from June, 2023)**

## **Academic Year 2023-2024**

Name of the Programme: BBA (Computer Application)

Class: S.Y.BBA (C.A.) (Semester - III)

Paper Code: UBCA232B

Title of Paper: Node JS

Credit: 3

No. of. Hours: 48

### **A] Learning Objectives:**

1. To Understand the JavaScript and technical concepts behind Node JS
2. To learn Structure a Node application in modules
3. To Understand and use the Event Emitter
4. To Understand Buffers, Streams, and Pipes
5. To Build a Web Server in Node and understand how it really works
6. To Use NPM and manage node packages.

### **B] Learning Outcomes:**

Student should be able to

1. Understand Node JS and REPL terminal.
2. Experiment with Node JS Modules and Node Package Manager.
3. Develop applications to handle events in Node JS.
4. Make use of Web Server to manage database.
5. Demonstrate Express Framework.

### **Topics/Contents**

#### **Unit 1 Introduction to Node JS**

**(04 L)**

1.1 Introduction

1.2 What is Node JS?

1.3 Features and advantages of Node JS

1.4 Traditional Web Server Model

- 1.5 Node.js Process Model
- 1.6 Asynchronous programming with Node.js
- 1.7 Types of applications that can be developed using Node.js
- 1.8 Setup Dev Environment
  - 1.8.1 Install Node.js on Windows
  - 1.8.2 Working in REPL
  - 1.8.3 Node JS Console
  - 1.8.4 Creating a Node File with JavaScript
  - 1.8.5 Accessing a Node.js File Through the Command Line Interface
  - 1.8.6 Using Node.js in Net-Beans IDE.

**Unit 2      Node JS Modules      (06 L)**

- 2.1 Primitive Types
- 2.2 Object Literal
- 2.3 Functions
- 2.4 Buffer
- 2.5 Access Global Scope
- 2.6 Module
- 2.7 Module Types
  - 2.7.1 Core Modules
  - 2.7.2 Local Modules
  - 2.7.3 Third Party Modules
- 2.8 Module Exports.
  - 2.8.1 Using Modules in a Node.js File
  - 2.8.2 Using the Built in HTTP & URL
- 2.9 Query String Module
- 2.10 Creating a Custom Module

**Unit 3      Node Package Manager      (05 L)**

- 3.1 What is NPM
- 3.2 Installing Packages Locally
- 3.3 Adding dependency in package.json
- 3.4 Installing packages globally
- 3.5 Updating packages

**Unit 4      Creating Web server      (03 L)**

- 4.1 Creating web server
- 4.2 Handling http requests
- 4.3 Sending requests

**Unit 5      File System      (06 L)**

- 5.1 Fs.readFile
- 5.2 Writing a File
- 5.3 Writing a file asynchronously
- 5.4 Opening a file
- 5.5 Deleting a file
- 5.6 Other IO Operations
  - 5.6.1 Append
  - 5.6.2 Rename
  - 5.6.3 Truncate.
- 5.7 File System Module with URL Module
  - 5.7.1 Create
  - 5.7.2 Read
  - 5.7.3 Remove a Directory

**Unit 6      Debugging Node JS Application      (04 L)**

- 6.1 Core Node JS debugger
- 6.2 Node Inspector
- 6.3 Debugging with Visual Studio

**Unit 7      Events      (04 L)**

- 7.1 EventEmitter class
- 7.2 Methods and Events of EvenEmitter Class
- 7.3 Returning event emitte
- 7.4 Extend EventEmitter Class
- 7.5 Passing Arguments and 'this' to listeners, Asynchronous and Synchronous call, Handle Events only Once
- 7.6 Inhering events
- 7.7 Error Events.

**Unit 8**      **Express.JS**      **(07 L)**

- 8.1 Introduction to Express Framework
- 8.2 Express Server Request-Response
- 8.3 Routes
  - 8.3.1 Route Parameters,
  - 8.3.2 Multiple Route Callback/Handler Functions,
  - 8.3.3 Methods of Response Object,
  - 8.3.4 Chaining Route Handlers,
- 8.4 Send Static Files,
- 8.5 Accept User Input,
- 8.6 File Upload with Express,
- 8.7 Manage Cookies,
- 8.8 Send file as a response,
- 8.9 Templates and Express.

**Unit 9**      **Serving Static Resources**      **(03 L)**

- 9.1 Serving static files
- 9.2 Working with middle ware

**Unit 10**      **Database connectivity**      **(06 L)**

- 10.1 Connection string
- 10.2 Configuring
- 10.3 Working with select command
- 10.4 Updating records
- 10.5 Deleting records
- 10.6 Drop tables
- 10.7 Ordered Result Set

**Reference Books:**

1. Basarat Ali Syed, Beginning Node.js, A press, 2014.
2. Learning Node: Moving to the Server-Side by Shelley Powers
3. Node.JS Web Development by David Herron
4. Express in Action. Writing, Building, and Testing Node.js Applications by Evan M. Hahn
5. Practical Node.js by Azat Mardan

**Website Reference Link:**

1. <https://nodejs.org/en/docs>

**Text Books:**

1. Dhruvi Shah, “Node.JS Guidebook”, BPB Publications, 2018.

**Evaluation:**

<b>Internal Evaluation</b>	<b>External Evaluation</b>
Unite Test (20)	Fill in the blanks, One Sentence Answer (12)
Assignments/Performance/Attendance / Seminars (20)	Short Notes (12) Short Answers Que (12) Short Answers Que (12) Long Answer Questions (12)
40	60

# SYLLABUS (CBCS) FOR S.Y.BBA (C.A.) (w. e. from June, 2023)

## Academic Year 2023-2024

Class : S.Y.BBA (C.A.) (Semester - III)

Paper Code : UBCA233

Title of Paper: Python Programming

Credit: 3

No. of. Lectures: 48

### A] Learning Objectives:

1. To develop problem solving skills and their implementation through Python
2. To understand and implement concept of object-oriented methodology and GUI Interface using Python.

### B] Learning Outcomes:

Student should be able to

1. Design and program Python applications.
2. Use String, lists, tuples, Set and Dictionaries in Python programs.
3. Use indexing and slicing to access data in Python programs.
4. Read and write files in Python.

## Topics / content

### Unit 1: Introduction to Python

(05L)

- 1.1 Basics of Python programming
- 1.2 Working with Python interpreter in interactive mode and script mode
- 1.3 Structure of a program
- 1.4 Debugging-errors and exceptions
- 1.5 Identifiers, keywords, constants
- 1.6 Variables, types of operators, precedence of operators
- 1.7 Data types, mutable and immutable data types
- 1.8 Statements, expressions, evaluation and comments, input and output statements
- 1.9 Data type conversion, Debugging

- 2.1 Introduction to Decision Control Statements
- 2.2 Selection /Conditional Branching Statements
  - 2.2.1 if statement
  - 2.2.2 if-else statement
  - 2.2.3 Nested if statement
  - 2.2.4 if-elif –else statement
- 2.3 Basic Loop Structures/Iterative Statements
  - 2.3.1 while Loop
  - 2.3.2 for Loop
  - 2.3.3 Selective an appropriate loop
- 2.4 Nested loops
- 2.5 The break statements
- 2.6 The continue Statement
- 2.7 The pass Statement
- 2.8 The else Statement used with loops

- 3.1 Introduction
  - 3.1.1 Need of Functions
- 3.2 Function definition
- 3.3 Function call
  - 3.3.1 Function Parameters
- 3.4 Variables Scope and Lifetime
  - 3.4.1 Local and Global variable
  - 3.4.2 Using the Global statement
  - 3.4.3 Resolution of Names
- 3.5 The return Statements
- 3.6 More on defining functions
  - 3.6.1 Required arguments
  - 3.6.2 Keyword arguments
  - 3.6.3 Default arguments
  - 3.6.4 Variable length arguments

3.7 Lambda Functions or anonymous functions

3.8 Recursive functions

3.8.1 Greatest common divisor

3.8.2 Finding exponents

3.8.3 The Fibonacci series

3.8.4 Recursion vs Iteration

**Unit 4: Data Structures**

**(11L)**

4.1 Strings

4.1.1 Initializing Strings and Accessing Strings

4.1.2 String Indexing, String Slicing, String Operations

4.1.3 Built-in functions for String Manipulation

4.1.4 String Traversal, String as Argument to Function.

4.2 Lists

4.2.1 List Operations—Creating, Initializing, Traversing and Manipulating Lists

4.2.2 List Methods and Built in Functions

4.2.3 Nested Lists

4.2.4 List as Argument to A Function.

4.3 Sets

4.3.1 Concept of Sets

4.3.2 Creating, Initializing and Accessing the Elements of Set

4.3.3 Sets Operation (Membership, Union, Intersection, Difference, and Symmetric Difference

4.4 Tuples

4.4.1 Creating Initializing, Accessing Elements, Tuple Assignment

4.4.2 Operations on Tuples

4.4.3 Tuple Methods and Built-in Functions

4.4.4 Nested Tuples.

4.5 Dictionary:

4.5.1 Concept of Key-Value Pair

4.5.2 Mutability

4.5.3 Creating, Initializing, Traversing, Updating and Deleting



Elements

4.5.4 Dictionary Methods and Built-In Functions.

**Unit 5: Modules**

**(06L)**

5.1 Modules loading and Execution

5.1.1 the form ..... import statements

5.1.2 Name of Module

5.1.3 Making your own module

5.1.4 The dir( ) Function

5.1.5 The Python Module

5.1.6 Modules and Namespaces

5.2 Packages in Python

5.2.1 Importing \* From a Package

5.2.2 Intra-Package References

5.2.3 Packages in Multiple Directories

5.3 Standard Library Modules

**Unit 6: Exception and File Handling in Python**

**(07L)**

6.1 Exception Handling

6.1.1 Syntax errors

6.1.2 Exceptions

6.1.3 Need of Exception Handling

6.2 User-defined exceptions

6.2.1 Raising Exceptions

6.2.2 Handling Exceptions

6.2.3 Catching Exceptions

6.2.4 Try - except - else clause,

6.2.5 Try - finally clause,

6.2.6 Recovering and Continuing with Finally

6.2.7 Built-In Exception Classes.

6.3 File Handling:

6.3.1 Text File and Binary File

6.3.2 File Types - Open and Close Files

6.3.3 Reading and Writing Text Files.

6.4 Reading and Writing Binary Files Using Pickle Module

6.5 File Access Modes.

## **Unit 7: Classes and Objects**

**(06L)**

7.1 Introduction

7.2 Classes and Objects

7.2.1 Defining Objects

7.2.2 Creating Objects

7.2.3 Data Abstraction & hiding through classes

7.3 Class method and self-argument

7.4 The `__init__()` Method (The Class Constructor)

7.5 Class Variables and Object Variables

7.6 The `__del__()` Method

7.7 Other special Methods

7.8 Public and Private Data Members

7.9 Private Methods

7.10 Calling a class Method from another Class method

7.11 Built-in Functions to check, Get, Set, and delete class Attributes

7.12 Built-in Class Attributes

7.13 Garbage Collection (Destroying Object)

7.14 Class Methods

7.15 Static Methods

### **Reference Books:**

1. Python Programming Problem Solving Approach by Reema Thareja, Oxford Higher Education
2. Learning Python By Mark Lutz, O'Reilly Publication
3. Programming with python, A users Book, Michael Dawson, Cengage Learning
4. Python Essential Reference, David Beazley, Third Edition
5. Python Bible
5. Python: The Complete Reference by Martin C. Brown

**Website Reference Link:**

1. <https://docs.python.org>
2. <https://www.javatpoint.com/python-tutorial>
3. <https://www.pythontutorial.net/>
4. <https://www.tutorialspoint.com/python/index.htm>

**Evaluation:**

<b>Internal Evaluation</b>	<b>External Evaluation</b>
Unite Test (20)	Fill in the blanks, One Sentence Answer (12)
Assignments/Performance/Attendance / Seminars (20)	Short Notes (12) Short Answers Que (12) Short Answers Que (12) Long Answer Questions (12)
<b>40</b>	<b>60</b>

# SYLLABUS (CBCS) FOR S.Y.BBA (C.A.) (w. e. from June, 2023)

## Academic Year 2023-2024

Class : S.Y.BBA (C.A.) (Semester - III)

Paper Code : U BCA234 Title of Paper: Operating System Concepts

Credit: 3 No. of. Lectures: 48

### A] Learning Objectives:

1. To learn the fundamentals of Operating Systems and handle processes and threads
2. To learn the mechanisms involved in memory management in contemporary OS
3. To know the scheduling concept
4. To learn about Basics of Linux.
5. To learn programmatically to implement Linux OS mechanisms
6. To know about Basic Administration of Linux
7. To understand design issues related to File management and various related algorithms

### B] Learning Outcomes:

Student should be able to

1. Learn the fundamentals of Operating Systems.
2. To know virtual memory concepts.
3. Learn Basic Administration of Linux.
4. To make aware of different types of disk scheduling algorithms.
5. To make aware of different algorithm used in memory management.

### Topics/Contents

<b>Unit 1:</b>	<b>Introduction to Operating System</b>	<b>(02L)</b>
	1.1 Overview of Operating Systems	
	1.2 Functionalities and Characteristics of OS	.
	1.3 Hardware Concepts related to OS,	
	1.4 CPU States	
	1.5 I/O Channels.	

**Unit 2:****Memory Management****(08L)**

- 2.1 Memory Management Techniques
- 2.2 Contiguous & Non-Contiguous Allocation
- 2.3 Logical & Physical Memory
- 2.4 Conversion of Logical to Physical Address
- 2.5 Paging
- 2.6 Segmentation
- 2.7 Segment with Paging
- 2.8 Virtual Memory Concept
- 2.9 Demand Paging
- 2.10 Page Replacement Algorithm
  - 2.10.1 FIFO Algorithm
  - 2.10.2 Optimal Algorithm
  - 2.10.3 MRU
  - 2.10.4 LRU
  - 2.10.5 Second Chance Algorithm
- 2.11 Thrashing

**Unit 3:****Processor Management and Synchronization****(10L)**

- 3.1 Process Control and Management
- 3.2 PCB
- 3.3 Job and Processor Scheduling
- 3.4 Scheduling Algorithms
  - 3.4.1 FCFS (Non-preemptive)
  - 3.4.2 SJF (Non-preemptive & preemptive)
  - 3.4.3 Priority (Non-preemptive & preemptive)
  - 3.4.4 Round Robin
- 3.5 Process Hierarchies
- 3.6 Problems of Concurrent Processes
  - 3.6.1 Critical Sections
  - 3.6.2 Mutual Exclusion
  - 3.6.3 Synchronization
  - 3.6.4 Deadlock

**Unit 4: Device Management & Information Management (08L)**

- 4.1. Introduction
- 4.2. Disk Scheduling
  - 4.2.1 FCFS
  - 4.2.2 Shortest Seek Time First
  - 4.2.3 SCAN
  - 4.2.4 C-Scan
  - 4.2.5 C- Look

**File System**

- 4.3. Introduction & File concepts (file attributes, Operations on files)
- 4.4. Access methods
  - 4.4.1 Sequential access
  - 4.4.2 Direct access
- 4.5. File Structure
  - 4.5.1 Contagious Allocation
  - 4.5.2 Linked Allocation
  - 4.5.3 Indexed Allocation

**Unit 5: Basics of Linux (07L)**

- 5.1 History
- 5.2 FOSS
- 5.3 Current Linux Distributions
- 5.4 Distros Examples
- 5.5 Linux Operating System Layers
- 5.6 The Linux Shell (different kinds of shell)
- 5.7 Process: (parent and child processes)
- 5.8 Files and Directories (File Structure and directory structure)
- 5.9 Interaction with System.

**Unit 6: Shells and Utilities (07L)**

- 6.1 Getting Started with Shell Programming
- 6.2 The Bash Shell
  - 6.2.1 Shell Commands
  - 6.2.2 The role of Shells in the Linux Environment
  - 6.2.3 Other Standard Shells

6.2.4 Write a Simple Shell Script - "Hello World!"

6.2.5 Variables in Shell

6.2.6 Bash Variable Existence Check

6.3 Customize the Bash Shell Environments:

6.3.1 Recalling Command History

6.3.2 Path Name Expansion

6.3.3 Create and Use Aliases

6.3.4 The Tilde Expansion

6.3.5 Startup Scripts Commonly Used Commands and Utilities.

**Unit 7: Basic Administration of Linux (06L)**

7.1 Basic System Administration (Run Levels, User Accounts)

7.2 Kernel Administration: (Linux Kernel Sources, Rebuilding Kernel, Installing Kernel)

7.3 Managing Users

7.4 Managing File Systems

7.5 Linux File Permissions

7.6 Devices and Modules (Device Drivers).

**Reference Books:**

1. Operating System Concepts, 9th Edition, John Wiley & Sons, Inc. by Silberschatz, Peter Baer Galvin, Greg Gagne.
2. Linux Administration, A Beginner's, Guide by Wale Soyinka, Tata McGrawHill.
3. Operating Systems: Internals and Design Principles, 8th edition Pearson Education Limited, 2014 by William Stallings.
4. Linux Shell Scripting by Ganesh Naik.
5. Linux Bible by Christopher Negus.

**Website Reference Link:**

1. <https://www.webopedia.com/operating-system>
2. <https://www.javatpoint.com/linux-system-admin-commands>

**Evaluation:**

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<b>40</b>	<b>60</b>



# SYLLABUS (CBCS) FOR S.Y.BBA (C.A.) (w. e. from June, 2023)

## Academic Year 2023-2024

Class: S.Y.BBA (C.A.) (Semester – III)

Paper Code: UBCA235 Title of Paper: Business Statistics using R Programming

Credit: 3 No. of. Lectures: 48

### A] Learning Objectives:

1. To understand role and importance of statistics in various business situation.
2. To develop skills related with basic statistical technique.
3. Develop right understanding regarding regression, correlation and data interpretation.
4. Understand how to link data, statistical methods using R Programming.

### B] Learning Outcomes:

Student should be able to

1. Get familiar with R software and learn basics of R with descriptive statistics.
2. Compute probabilities and fitting of probability distribution with R environment.
3. Appreciate and apply the R programming from a statistical perspective.
4. Understand the basics in R programming in terms of constructs, control statements, string functions.

### Topics/Contents

#### Unit1 Introduction to Statistics

(8L)

- 1.1 Introduction to Statistics
- 1.2 Importance of Statistics in Modern Business Environment.
- 1.3 Need of Data
- 1.4 Types of Data
- 1.5 Principles of Measurement
- 1.6 Source of Data
- 1.7 Data Classification

#### Graphical Methods

- 1.8 Raw Data
- 1.9 Attributes, Variables and Classification

1.10 Frequency Distribution

1.11 Cumulative Frequency Distributions.

1.12 Graphs -Histogram, Frequency Polygon, Scattered plot

1.13 Diagrams - Multiple Bar, Pie, Subdivided Bar.

**Unit2 Measures of Central Tendency and Dispersion**

**(8L)**

2.1 Criteria for Good Measures of Central Tendency.

2.2 Arithmetic Mean, Median and Mode for Grouped  
and Ungrouped Data, Combined Mean.

**Measures of Dispersion:**

2.3 Concept of Dispersion

2.4 Absolute and Relative Measure of Dispersion

2.5 Range, Variance

2.6 Standard Deviation

2.7 Coefficient of Variation

2.8 Quartile Deviation

2.9 Coefficient of Quartile Deviation

**Unit3 Probability and Probability Distribution**

**(8L)**

3.1 Basics of Probability

3.2 Conditional Probability

3.3 Counting Principles-Permutation and Combination

3.4 Random Variable

3.5 Expected Values and Variance

**Probability Distribution**

3.6 Normal Distribution- Probability function, Mean and Variance, Standard  
deviation, Skewness and Kurtosis

3.7 Bernoulli –Probability Function, Mean and Variance

3.8 Binomial- Probability Distribution, Cumulative Probability Distribution,  
Mean and Variance.

**Unit4 Sampling and Sampling Statistics**

**(6L)**

4.1 Population and Sample

4.2 Sampling Strategies

4.2.1 SRSWR

4.2.2 SRSWOR

4.3 Distribution of Sampling Strategies

4.4 Mean, Variance, Standard Deviation

4.5 Central Limit Theorem

**Unit5 Simple Correlation and Regression**

**(8L)**

5.1 Concept of Correlation

5.2 Positive & Negative Correlation

5.3 Karl Pearson's Coefficient of Correlation

5.4 Meaning of Regression

5.5 Simple linear equation

5.6 Two Regression Equations

5.7 Regression Coefficients and Properties.

**Unit6 Basics of R programming**

**(10L)**

6.1 Introduction, Basic Features of R, Data Types and  
Data Structures in R, Variables, Operators

6.2 R Commands and Functions

6.3 Creating a Vector using C, Scan Function

6.4 Data Frame –Creating, Accessing and Merging  
Data Frame

6.5 Importing Data from File

6.6 Using Read Table Command

6.7 Saving the R-output in a File

6.8 Concept of R-script File

6.9 Graphics using R:

6.9.1 High Level Plotting Functions

6.9.2 Low Level Plotting Functions

6.9.3 Interactive Graphic Functions

**Programming in R**

6.10 Statements: if and if...else, for loop

6.11 Cat and Print Commands.

### **Reference Books:**

1. Business Statistics, J. K. Sharma, Pearson Education-2nd Edition
2. Business Statistics, Naval Bajpai, Pearson Education-2nd Edition
3. Complete Business Statistics, Amir Aczel, Jayavel Sounderpandian, (Seventh Edition)
4. Statistics - An introduction using R. John Wiley, London, Crawley, M. J. (2006).
5. Statistics using R, second edition. Narosa Publishing House, New Delhi, Purohit, S.G.;Gore, S.D. and Deshmukh, S.R. (2015).

### **Website Reference Link:**

1. <https://www.tutorialspoint.com/statistics/probability.html>.
2. <https://statisticsbyjim.com/basics/introduction-statistics-r-programming-language/>
3. Central Tendency | Understanding the Mean, Median & Mode (scribbr.com)

### **Evaluation:**

<b>Internal Evaluation</b>	<b>External Evaluation</b>
Unite Test (20)	Fill in the blanks, One Sentence Answer (12)
Assignments/Performance/Attendance / Seminars (20)	Short Notes (12) Short Answers Que (12) Short Answers Que (12) Long Answer Questions (12)
<b>40</b>	<b>60</b>

# SYLLABUS (CBCS) FOR S.Y.BBA (C.A.) (w. e. from June, 2023)

## Academic Year 2023-2024

Class : S.Y.BBA (C.A.) (Semester - IV)

Paper Code : UBCA241 Title of Paper: Advanced Java Programming

Credit: 3 No. of. Lectures: 48

### A] Learning Objectives:

1. To learn the advanced concepts of Java Programming.
2. To learn to design game-based applications using Graphics, Animations, and Multithreading.
3. To learn to design and develop web applications.
4. To understand how to use programming in day-to-day applications.
5. To understand network programming.

### B] Learning Outcomes:

A student should be able to

1. Learn to access database using Java Data Base Connectivity in Java programs.
2. Learn to use an Applet for internet programming.
3. Develop dynamic webpages using Servlets and JSP.
4. Develop client/server applications and TCP/IP socket programming.

### Topics/Content

<b>Unit 1:</b>	<b>JDBC</b>	<b>(08L)</b>
1.1	The Design of JDBC	
1.2	Basic JDBC Program Concept	
1.3	Drivers	
1.4	Architecture of JDBC	
1.5	Making the Connection, Statement, Result Set, Prepared Statement, Callable Statement	
1.6	Executing SQL Commands	
1.7	Executing Queries	

**Unit 2: Multithreading** (08L)

- 2.1 Threading Basics
- 2.2 Life Cycle of a Thread
- 2.3 Creating Threads
- 2.4 Priorities and Synchronization
- 2.5 Inter Thread Communication
- 2.6 Runnable Interface

**Unit 3: Servlet** (08L)

- 3.1 Introduction
- 3.2 How It Differs from CGI
- 3.3 Types of Servlets
- 3.4 The Life Cycle of a Servlet
- 3.5 Execution Process of Servlet Application
- 3.6 Session Tracking
- 3.7 Cookie Class
- 3.8 Servlet- JDBC

**Unit 4: JSP** (06L)

- 4.1 Introduction to JSP
- 4.2 The Life Cycle of a JSP
- 4.3 Components of JSP Directives, Tags, Scripting Elements
- 4.4 Execution process of JSP Application
- 4.5 Building a simple application using JSP
- 4.6 JSP with Database

**Unit 5: Networking** (08L)

- 5.1 The java.net package
- 5.2 Connection-Oriented Transmission – Stream Socket Class
- 5.3 Creating a Socket to a Remote Host on a Port (Creating TCP Client and Server)
- 5.4 Simple Socket Program Example

**Spring:**

- 6.1 Introduction
- 6.2 Applications and Benefits of spring
- 6.3 Architecture and Environment Setup
- 6.4 Hello World Example
- 6.5 Core Spring- IoC Containers, Spring Bean Definition, Scope, Lifecycle

**Hibernate**

- 6.6 Architecture and Environment
- 6.7 Configuration, Sessions, Persistent Class
- 6.8 Mapping Files, Mapping Types
- 6.9 Examples

**Reference Books:**

1. The Complete Reference – JAVA Herbert Schildt
2. Core java –II by Cay S. Horstmann and Gary Cornell
3. Complete Reference J2EE – Jim Keogh
4. Head First Java, Kathy Sierra & Bert Bates, 2nd Edition, Shroff/O'Reilly
5. Java Persistence with Hibernate by Christian Bauer, Gavin King

**Website Reference Link:**

1. [www.W3schools.com](http://www.W3schools.com)
2. <https://www.javatpoint.com>

**Evaluation:**

<b>Internal Evaluation</b>	<b>External Evaluation</b>
Unite Test (20)	Fill in the blanks, One Sentence Answer (12)
Assignments/Performance/Attendance / Seminars (20)	Short Notes (12) Short Answers Que (12) Short Answers Que (12) Long Answer Questions (12)
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# SYLLABUS (CBCS) FOR S.Y.BBA (C.A.) (w. e. from June, 2023)

Academic Year 2023-2024

Class : S.Y.BBA (C.A.) (Semester - IV)

Paper Code : UBCA242A

Title of Paper: Advanced PHP

Credit: 3

No. of. Lectures: 48

## A] Learning Objectives:

1. To know & understand concepts of internet programming.
2. Understand how server-side programming works on the web.
3. Understanding How to use WordPress.

## B] Learning Outcomes:

1. Students will able to implement OOP's concept in PHP.
2. Students will able to write interactive programs using PHP.
3. Students will able to Analyze the construction of a web page and relate how PHP and XML combine to produce the web page.
6. Students will able to combine Ajax with PHP.
5. Students learn different type of web services.

## Topics/ Contents

<b>Unit 1</b>	<b>Introduction to Object Oriented Programming in PHP</b>	<b>(08L)</b>
	1.1 Classes	
	1.2 Objects	
	1.3 Introspection	
	1.4 Serialization	
	1.5 Inheritance	
	1.6 Interfaces	
	1.7 Encapsulation	
<b>Unit 2</b>	<b>Web Techniques</b>	<b>(05L)</b>
	2.1 Server information	
	2.2 Processing forms	
	2.3 Sticky forms	
	2.4 Setting response headers	



**Unit 3 XML (07L)**

- 3.1 Introduction XML
- 3.2 XML document Structure
- 3.3 PHP and XML
- 3.4 XML parser
- 3.5 The document object model
- 3.6 The simple XML extension
- 3.7 Changing a value with simple XML

**Unit 4 Ajax with PHP (10L)**

- 4.1 Understanding java scripts for AJAX
- 4.2 AJAX web application model
- 4.3 AJAX –PHP framework
- 4.4 Performing AJAX validation
- 4.5 Handling XML data using php and AJAX
- 4.6 Connecting database using php and AJAX

**Unit 5 Introduction to Web Services (08L)**

- 5.1 Definition of web services
- 5.2 Basic operational model of web services, tools and technologies enabling web services
- 5.3 Benefits and challenges of using web services.
- 5.4 Web services Architecture and its characteristics
- 5.5 Core building blocks of web services
- 5.6 Standards and technologies available for implementing web services
- 5.7 Web services communication models
- 5.8 Basic steps of implementing web services.

**Unit 6 WordPress (10L)**

**6.1 Installing WordPress**

- 6.1.1 Uploading WordPress to your Web Server
- 6.1.2 Installing WordPress
- 6.1.3 Database Connectivity
- 6.1.4 Theme Customization

**6.2 Configuring WordPress**

- 6.2.1 Using the WordPress Dashboard

- 6.2.2 Managing Content in the WordPress Dashboard
- 6.2.3 Types of Users
- 6.2.4 The WordPress Settings Panel
- 6.2.5 Reading and Writing Settings
- 6.2.6 Permalinks and RSS Feeds
- 6.2.7 Creating and Managing Posts
- 6.2.8 Setting up Post Categories
- 6.2.9 Creating and Managing Pages
- 6.2.10 Managing Comments
- 6.2.11 Installing and Updating Plugins
- 6.2.12 Customizing WordPress Themes
- 6.2.13 WordPress Theme Options

### **Reference Books:**

1. Php: A Beginner's Guide 1st Edition McGraw-Hill Osborne Media; 1 edition  
by Vikram Vaswani
2. Murach's PHP and MySQL (2nd Edition) by Joel Murach and Ray Harris
3. PHP: The Complete Reference Paperback – 1 Jul 2017 by Steven Holzner (Author)
4. Building Web Services with Java, 2nd Edition, S. Graham and others, Pearson  
Edn., 2008.
5. WordPress 5 Complete Seventh Edition – Karol Krol
6. HTML 5 Black Book (Covers CSS3, JavaScript, XML, XHTML, AJAX, PHP,  
jQuery) 2Ed
7. PHP web services - Wrox publication

### **Website Reference Link:**

1. [www.php.net.in](http://www.php.net.in)
2. [www.W3schools.com](http://www.W3schools.com)

**Evaluation:**

<b>Internal Evaluation</b>	<b>External Evaluation</b>
Unite Test (20)	Fill in the blanks, One Sentence Answer (12)
Assignments/Performance/Attendance / Seminars (20)	Short Notes (12) Short Answers Que (12) Short Answers Que (12) Long Answer Questions (12)
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# SYLLABUS (CBCS) FOR S.Y.BBA (C.A.) (w.e. from June, 2023)

Academic Year 2023-2024

Name of the Programme: BBA (Computer Application)

Class: S.Y.BBA (C.A.) (Semester - IV)

Paper Code: UBCA242B

Title of Paper: React JS

Credit: 3

No. of. Hours: 48

## A] Learning Objectives:

1. Understand how Single Page React application is different than traditional web development frameworks.
2. Understand and use React, React Router, Redux, Redux Saga and other popular libraries.
3. Use styled-components to create presentational components (CSS in JS)
4. Understand the programming model provided by the React framework
5. Define React components.
6. Use the React framework to handle events and state full data.

## B] Learning Outcomes:

By the end of the course, you will be able to:

1. To Create React Components
2. To Perform some simple tests
3. To Think in React
4. To Add state and props to an application
5. To Add inverse data flow to an application
6. To Use some common React Hooks
7. To Use external services to provide data
8. To Set up a single page application
9. To Use Context and Reducers

## Topics/Contents

### Unit 1 Introduction to React JS

(05L)

4.1 Introduction

4.2 What is React JS?

4.3 Why React?

- 4.4 Advantages of React JS
- 4.5 React version history
- 4.6 React 16 vs React 15
- 4.7 Just React – Hello World
- 4.8 Using create-react-app
- 4.9 Anatomy of react project
- 4.10 Running the app
- 4.11 Debugging first react appion

**Unit 2      Overview of JSX      (06L)**

- 2.1 Introduction of Virtual DOM.
- 2.2 Difference between JS and JSX.
- 2.3 React Components Overview
- 2.4 Containers and Components
- 2.5 What is Child Components?
- 2.6 What is Name spaced Components?
- 2.7 What are the JavaScript expressions available in JSX?

**Unit 3      Real-Time Application By Using React JS      (05L)**

- 3.1 Create a React Component with JSX template.
- 3.2 How to create Nested Components?
- 3.3 What is React JS render?
- 3.4 React Props overview.
- 3.5 Introduction of Props validation with data types.
- 3.6 Flow of States, Initialize states and update states.

**Unit 4      React JS Forms And UI      (07L)**

- 4.1 Form Components.
- 4.2 Setup Controlled and Uncontrolled form components.
- 4.3 Control Input elements.
- 4.4 How to set default values on all formats of Input elements.
- 4.5 React JS Form validations.
- 4.6 React CSS Components
  - 4.6.1 Inline Styling
  - 4.6.2 CSS Stylesheet
  - 4.6.3 CSS Module
  - 4.6.4 Styled Component

## 4.7 Animations overview

<b>Unit 5</b>	<b>React JS Component</b>	(05L)
	5.1 React Component Life-Cycle	
	5.2 Types of Components	
	5.2.1 Functional Components	
	5.2.2 Class based Components	
	5.2.3 Pure Components	
	5.2.4 Higher-Order Components	
<b>Unit 6</b>	<b>Routing in React JS</b>	(06L)
	6.1 What is a React Router?	
	6.2 Need for React Router	
	6.3 How to Add and Set up a React Router?	
	6.4 Components in React Router	
	6.4.1 BrowserRouter	
	6.4.2 HashRouter	
	6.5 What is Route?	
	6.6 Adding Navigation using Link component	
<b>Unit 7</b>	<b>Event Handling</b>	(06L)
	7.1 React Events : Naming	
	7.2 How to Define React Events?	
	7.3 What are Synthetic React Events?	
	7.4 Basics of React Event Handling	
	7.5 Event Handling in React: Additional Examples	
	7.6 Adding Events	
	7.7 Passing Arguments to Event Handler	
<b>Unit 8</b>	<b>State Management in React JS</b>	(08L)
	8.1 What is State?	
	8.2 Introduction to Redux	
	8.3 Redux store, actions and reducers	
	8.4 Connecting React Components to Redux store	

### **Reference Books:**

1. Full Stack React by Anthony Accomazzo, Nate Murray, Ari Lerner, Clay Allsopp, David Guttman, and Tyler McGinnis.
2. Learning React: Functional Web Development with React and Redux by Alex Banks and Eve Porcello O'REILLY
3. Beginning React (incl. Redux and React Hooks) Book by Greg Lim
4. React Explained: Your Step-by-Step Guide to React by Zac Gordon
5. Learning React by Kirupa Chinnathambi

### **Website Reference Link:**

1. <https://legacy.reactjs.org/docs/forms.html>
2. <https://www.javatpoint.com/react-component-life-cycle>
3. <https://www.emizentech.com/blog/types-of-react-components.html>
4. <https://levelup.gitconnected.com/types-of-react-components-a38ce18e35ab>
5. <https://www.knowledgehut.com/blog/web-development/handling-react-events-guide>

### **Evaluation:**

<b>Internal Evaluation</b>	<b>External Evaluation</b>
Unite Test (20)	Fill in the blanks, One Sentence Answer (12)
Assignments/Performance/Attendance / Seminars (20)	Short Notes (12) Short Answers Que (12) Short Answers Que (12) Long Answer Questions (12)
<b>40</b>	<b>60</b>

## **SYLLABUS (CBCS) FOR S.Y.BBA (C.A.) (w. e. from June, 2023)**

**Academic Year 2023-2024**

Class : S.Y.BBA (C.A.) Semester – IV)

Paper Code : UBCA243                      Title of Paper: Mathematical Foundation for  
Computer Applications

Credit: 3

No. of. Lectures: 48

### **A] Learning Objectives:**

1. To learn the basic functions and summation.
2. To understand the ideas of the basis step and the inductive step in a proof by mathematical induction.
3. To understand concepts of Determinants and Matrices.
4. To understand how to solve simultaneous equations using determinants and Matrix Theory.
5. To understand how to perform the operations of union, intersection, complement, and difference on sets using proper notation.

### **B] Learning Outcomes:**

Student should be able to

1. Use correct and proper notation with prediction with predicates and variables to write valid induction proofs.
2. Utilize applications of matrices to solve industrial problem.
3. Basic knowledge of set theory, functions, and relations concepts,
4. Matrix needed for designing and solving problems.
5. Construct simple mathematical proofs and possess the ability to verify them.



## Topics/Contents

### Unit1 **Sequence, Series and Mathematical Induction** (10L)

- 1.1 Sequence and Series.
- 1.2 Arithmetic Progression (A.P.), Arithmetic Mean (A.M.), Geometric Progression (G.P.), general term of a G.P., sum of n terms of a G.P. Arithmetic and geometric series, infinite G.P. and its sum, geometric mean (G.M.).
- 1.3 Relation between A.M. and G.M.
- 1.4 Process of the proof by induction
- 1.5 The principle of mathematical induction and simple applications

### Unit2 **Sets** (12L)

- 2.1 Introduction.
- 2.2 Methods of describing of a set: Tabular form, Set builder form.
- 2.3 Finite set, Infinite set, Empty set, Power set, Subset, Universal set, Equal sets, Disjoint sets, Complementary set.
- 2.4 Operation on Sets: Union of sets, Intersection of sets, Difference of sets, Examples.
- 2.5 De Morgan's Laws (without proof).
- 2.6 Venn diagram, Examples.
- 2.7 Cartesian product of two sets, Examples.
- 2.8 Idempotent laws, Identity laws, Commutative Laws, Associative laws, Distributive laws, Inverse laws, Involution laws.
- 2.9 Duality.
- 2.10 Examples based on above.

### Unit 3 **Relations and Functions** (12L)

- 3.1 Relation: Binary relations as ordered pairs and verbal description
- 3.2 The reflexive, symmetric, transitive and antisymmetric properties of binary relations.
- 3.3 Functions: Definition and examples

- 3.4 Properties of functions
- 3.5 one-to-one, onto, bijective
- 3.6 function composition, inverse function
- 3.7 Examples based on above.

#### **Unit 4      Matrix and Determinant**

**(14L)**

- 4.1 Introduction.
- 4.2 Types of matrices: Row matrix, Column matrix, Null matrix, Unit matrix, Square Matrix, Diagonal matrix, Scalar matrix, Symmetric matrix, Skew -symmetric matrix, Transpose of a matrix.
- 4.3 Definition of Determinants of order 2nd & 3rd and their expansions.
- 4.4 Singular and Non-Singular Matrices.
- 4.5 Algebra of Matrices: Equality of matrices, Scalar Multiplication of Matrix, Addition of matrices, Subtraction of matrices, Multiplication of matrices.
- 4.6 Elementary Row & Column Transformations.
- 4.7 Inverse of Matrix.
- 4.8 Examples based on above

#### **Reference Books:**

1. Mathematical Foundations of Data analysis – Jeft. M. Phillips
2. Calculus and Linear Algebra - Book by Donald John Lewis and Wilfred Kaplan
3. Vector Calculus, Linear Algebra, and Differential Forms- John H. Hubbard, Barbara Hubbard
4. Discrete Mathematics & Structures by Satinder Bal Gupta, University Science Press
5. Fundamental Approach to Discrete Mathematics by D. P. Acharjya,

**Evaluation:**

<b>Internal Evaluation</b>	<b>External Evaluation</b>
Unite Test (20)	Fill in the blanks, One
Assignments/Performance/Attendance / Seminars (20)	Sentence Answer (12) Short Notes (12) Short Answers Que (12) Short Answers Que (12) Long Answer Questions (12)
<b>40</b>	<b>60</b>

# SYLLABUS (CBCS) FOR S.Y.BBA (C.A.) (w.e. from June, 2023)

**Academic Year 2023-2024**

Name of the Programme: BBA (Computer Application)

Class: S.Y.BBA (C.A.) (Semester - IV)

Paper Code: UBCA244      Title of Paper: Software Testing and Automation

Credit: 3      No. of. Hours: 48

## **A] Learning Objectives:**

1. To understand the basics of Software Testing.
2. To understand how to test bugs in Software.
3. To learn how to do the Testing and Planning effectively.
4. To build test cases and execute them.
5. To understand the basic of quality software and quality factors.

## **B] Learning Outcomes:**

1. Understand the basic concepts of software testing and the need for software testing
2. Design Test planning and different activities involved in test planning
3. Design effective test cases that can uncover critical defects in the application
4. Carry out advanced types of testing
5. Automate the software testing using Selenium and TestNG.

## **Topics/Contents**

<b>Unit1</b>	<b>Software Testing</b>	<b>(07L)</b>
	1.1 Introduction, Nature of Errors,	
	1.2 Testing Objectives	
	1.3 Testing Principles	
	1.4 Testing Fundamentals,	
	1.5 Software Testing Life Cycle	
	1.6 Bug Life Cycle	
	1.7 Debugging	

<b>Unit2</b>	<b>Approaches to Testing –Testing Methods</b>	<b>(07L)</b>
	2.1 White Box Testing and Types of White Box Testing	
	2.2 Test Case Design	
	2.3 Black Box Testing and Types of Black Box Testing	
	2.4 Gray Box Testing	
<b>Unit3</b>	<b>Software Testing Strategies</b>	<b>(10L)</b>
	3.1 Software Testing Process	
	3.2 Unit Testing	
	3.3 Integration- Top-down ,Bottom up	
	3.4 System Testing	
	3.5 Acceptance Testing (Alpha, Beta Testing)	
	3.6 Validation and Verification	
	3.7 Big Bang Approach	
	3.8 Sandwich Approach	
	3.9 Performance Testing	
	3.10 Regression Testing	
	3.11 Smoke Testing	
	3.13 Load Testing	
<b>Unit4</b>	<b>Testing for Specialized Environments</b>	<b>(06L)</b>
	4.1 Testing GUI's	
	4.2 Testing of Client/Server Architectures	
	4.3 Testing Documentation and Help Facilities	
	4.4 Testing for Real-Time Systems	
<b>Unit5</b>	<b>Testing Tools&amp; Software Quality Assurance (Introduction)</b>	<b>(10L)</b>
	5.1 JUnit(TestNG), Apache JMeter, Win runner	
	5.2 Load runner, Rational Robot	
	5.3Ranorex	
	5.4 Headpin,	
	5.5 Sqish	
	5.6 QTP	
	5.7 Definition of Quality, QA, QC, SQA	
	5.8 SQA Planning	
	5.9 SQA Activities	

- 5.10 Software Quality Assurance Metrics –
- 5.11 Measurement Software Quality Metrics
- 5.12 Product Quality Metrics
- 5.13 In-Process Quality Metrics

**Unit6 Test Automation and Tools (08L)**

- 6.1 Automated Software Testing
- 6.2 Automate Testing of Web Applications
- 6.3 Selenium: Introducing Web Driver and Web Elements
- 6.4 Locating Web Elements, Actions on Web Elements, Different Web Drivers
- 6.5 Understanding Web Driver Events, Testing: Understanding Testing.xml, Adding Classes, Packages, Methods to Test, Test Reports.

**References Books:**

1. Yogesh Singh, “Software Testing”, Cambridge University Press, 2012
2. Unmesh Gundecha, Satya Avasarala, "Selenium WebDriver 3 Practical Guide" - Second Edition 2018
3. Glenford J. Myers, Corey Sandler, Tom Badgett, the Art of Software Testing, 3rd Edition, 2012, John Wiley & Sons, Inc.
4. Ron Patton, Software testing, 2nd Edition, 2006, Sams Publishing
5. Carl Cocchiaro, Selenium Framework Design in Data-Driven Testing, 2018, Packt Publishing.
6. Elfriede Dustin, Thom Garrett, Bernie Gaurf, Implementing Automated Software Testing, 2009, Pearson Education, Inc.
7. Satya Avasarala, Selenium WebDriver Practical Guide, 2014, Packt Publishing.
8. Varun Menon, TestNg Beginner's Guide, 2013, Packt Publishing.
9. Total quality management, Dale H.Bestrefield, Prentice Hall,2003

**Website Reference Link:**

1. [www.opensourcetesting.org](http://www.opensourcetesting.org)

**Evaluation:**

<b>Internal Evaluation</b>	<b>External Evaluation</b>
Unite Test (20)	Fill in the blanks, One Sentence Answer (12)
Assignments/Performance/Attendance / Seminars (20)	Short Notes (12) Short Answers Que (12) Short Answers Que (12) Long Answer Questions (12)
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# SYLLABUS (CBCS) FOR S.Y.BBA (C.A.) (w. e. from June, 2023)

## Academic Year 2023-2024

Class : S.Y.BBA (C.A.) (Semester - IV)

Paper Code : UBCA245 Title of Paper: Networking

Credit: 3 No. of. Lectures: 48

### A] Learning Objectives:

1. To understand various computer networks and technologies behind networks
2. To study TCP/IP suite.
3. To study routing concept along with Routing protocols
4. To be familiar with wireless networking concepts and protocols

### B] Learning Outcomes:

Student should be able to

1. Understand various computer networks and technologies behind networks
2. Learn TCP/IP suite
3. Learn routing concept along with Routing protocols
4. Get knowledge of wireless networking concepts and protocols

### Topics/Contents

#### **Unit 1: Introduction to Data Communication and Computer Networks** (06L)

1.1 Overview of Basic Concepts and Components. Data Communication Characteristic, Data Representation, Data Flow, Network Criteria, Physical Structures and Topologies, Network Types- LAN, MAN, WAN

1.2 Internet

1.2.1 Concept of Intranet & Extranet

1.2.2 Internet Information Server (IIS)

1.2.3 World Wide Web(WWW)

1.2.4 Search Engine



1.2.5 Internet Service Providers (ISP)

1.3 Various types of Networks (only overview)

1.3.1 Connection Oriented N/W's Vs.

Connectionless N/W'

1.3.2 Ethernet

1.3.3 Wireless LAN

1.3.4 X.25

1.3.5 ATM

**Unit 2: Principles of Layering Concept** (10L)

2.1 Need for Layering

2.2 ISO-OSI 7 Layer Model

2.3 TCP/IP Model

2.4 Comparison of ISO-OSI&TCP/IP Model

2.5 Physical Communication:

2.5.1 Hardware Architecture

2.5.2 Transmission Media

(Guided and Unguided i.e. Twisted Pair, Coaxial Cable, Fiber Optics, Wireless Transmission etc.)

2.5.3 Communication Devices (Switch, Router etc.)

2.5.4 Switching and its Types

(Circuit Switching, Message Switching, Packet Switching)

**Unit 3: Link Layer Communication** (08L)

3.1 Error Detection and Correction Techniques

3.2 Framing and its Types

3.3 Flow and Error Control

3.4 HDLC Protocol

3.5 P2P Protocol

Note: Examples based on 3.1 to be covered

**Unit 4: IP Addressing & Routing** (08L)

4.1 Internet Protocol and IPv4 Packet Format

4.2 Addressing, Physical Addresses, Logical Addresses  
Port Addresses, Specific Addresses

4.3 IP Address- Network Part and Host Part

- 4.4 Network Masks, Network Addresses and, Broadcast Addresses, Loop Back Address
- 4.5 Address Classes
- 4.6 TCP and UDP Connections
- 4.7 Overview of IPv6

Notes: Examples based on IP addressing to be covered

**Unit 5: Routing Protocol** (04L)

- 5.1 IP Routing Concept,
- 5.2 Routing Tables
- 5.3 Routing Protocols – RIP, IGRP, EIGRP, OSPF, BGP  
Domain Name System (DNS)
- 5.4 Domain Namespace
- 5.5 DNS in the Internet
- 5.6 DNS Resolution and Caching
- 5.7 Resource Records, DNS Message

**Unit 6: Network Applications** (08L)

- 6.1 Hyper Text Transfer Protocol (HTTP), HTTP  
Communications –HTTP Request, Request,  
Headers, Responses, Status Code, Error Status Code
- 6.2 Email- Sending & Receiving Email, Email  
Addressing, Message Structure, SMTP – Simple Mail  
Transfer Protocol, POP – Post Office Protocol, IMAP-  
Internet Message Access Protocol, FTP- File Transfer  
Protocol

**Unit 7: Overview of Network Security** (04L)

- 7.1 Active and Passive Attacks
- 7.2 Cryptography (Symmetric and Asymmetric)
- 7.3 Firewall

### Reference Books:

1. Computer Networks Andrew S. Tanenbaum 4e
2. Data Communication and Networking Behroz A. Forouzan, TMH, 4thEd
3. Cryptography and Network Security Atul Kahate, TMH 2ndEd.
4. Network Essential Notes GSW MCSE Study Notes
5. Networking: The Complete Reference Book by Craig Zacker

### **Evaluation:**

<b>Internal Evaluation</b>	<b>External Evaluation</b>
Unite Test (20)	Fill in the blanks, One Sentence Answer (12)
Assignments/Performance/Attendance / Seminars (20)	Short Notes (12) Short Answers Que (12) Short Answers Que (12) Long Answer Questions (12)
<b>40</b>	<b>60</b>

# SYLLABUS (CBCS) FOR S.Y.BBA (C.A.) (w. e. from June, 2023)

## Academic Year 2023-2024

Class : S.Y.BBA (C.A.) (Semester - IV)

Paper Code : UBCA245

Title of Paper: Project

Credit: 4

No. of. Lectures: 48

### A] Learning Objectives:

1. To introduced project planning.
2. To Examine the stages of project planning: Scoping, Estimation, analysis and Designing.
3. To Focus on the tools available to a project planner.
4. To discuss project planning and the planning process.
5. To meet all project goals successfully.

### B] Learning Outcomes:

Student should be able to:

1. Learn project management.
2. Become systems thinkers.
3. Become explorers.
4. Become problem-solvers.
5. More engaged in the learning process.
6. Learn to take creative risks.

### Evaluation:

External Evaluation	Marks
Project Report	30
Power Point Presentation	10
Viva	20
Project Logic	20
Project Demonstrations	20
<b>Total</b>	<b>100</b>

