SYLLABUS STRUCTURE OF

S.Y.BBA (CA) (2019 Pattern)

Bachelor of Business Administration (Computer Application)

Syllabus (CBCS Pattern) under Academic Autonomy for the year 2020-2021

Semester –IV (w. e. f. A.Y. 2020-2021)

Subject Code	Name of Subject	Marks			Credit
		Int.	Ext.	Total	
BCA2401	Advanced Java Programming	40	60	100	03
BCA2402	Advanced Web Technologies	40	60	100	03
BCA2403	Mathematical Foundation for Data Science	40	60	100	03
BCA2404	Software Testing and Quality Assurance	40	60	100	03
BCA2405	Networking	40	60	100	03
BCA2406	Computer Laboratory based on (BCA2401 and BCA2402)	40	60	100	02
BCA2407	Computer Laboratory based on (BCA2404 and BCA2405)	40	60	100	02
PR-22	Project	-	-	-	04
	Total	**280**	**420**	**700**	**23**

BBA (C.A) Programme Outcome

PSO1. Knowledge: To understand and apply the fundamental principles, concepts, and methods in diverse areas of computer science, computer applications, management, mathematics, statistics, etc.

PSO2. Problem Analysis: Identify, analyse and formulate complex real-life computing problems. Attain substantiated conclusions to solve the problems using fundamental principles of computer science and application domains by using various tools and emerging technologies.

PSO3. Design and Development: Design and develop efficient solutions for complex real-world computing problems and design system components or processes that meet the specified needs with appropriate consideration for public health and safety and the cultural, societal, and environmental considerations.

PSO4.Conduct investigations of complex problems: Ability to research, analyze and Investigate complex computing problems through the design of experiments, analysis, and interpretation of data, and synthesis of the information to arrive at valid conclusions.

PSO5. Modern Tool Usage: Create, identify and apply appropriate techniques, skills, and modern computing tools to computing activities.

PSO6. Ethics and Social Responsibility: Understand and commit to professional ethics and cyber regulations, responsibilities, and norms of professional computing practices.

PSO7. Individual and Team Work: Ability to work effectively as an individual, and as a member or leader as per need in, multidisciplinary teams.

PSO8. Life-Long Learning: Recognize the need and have the ability to engage in independent continuous reflective learning in the context of technological advancement.

PSO9. Project Management: Understand and apply computing, management principles to manage projects.

PSO10. Communication: Able to use interpersonal skills and communicate effectively with the professionals and with society to convey technical information effectively and accurately and able to comprehend and write effective reports, design documentation, and make effective presentations.

PSO11. Innovation, employability, and Entrepreneurial skills:

Identify opportunities, and pursue those opportunities to create value and wealth for the betterment of the individual and society at large.

Academic Year 2020-2021

Name of the Programme : BBA(Computer Application)

Class : **S.Y.BBA (C.A.) (Semester - IV)**
Paper Code : **BCA2401**
Title of Paper: Advanced Java

Credit: 3 **No. of. Lectures: 48**

A] Course 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] Course Outcomes:
 By the end of the course, students will be able to:

CO1. Learn to access database using Java Data Base Connectivity in Java programs.
CO2. Develop multithreaded application with synchronization.
CO3. Explore and understand Java Server Pages.
CO4. Develop dynamic webpages using Servlets.
CO5. Develop dynamic webpages using JSP.
CO6. Develop and utilize client/server applications and TCP/IP socket programming.

Topics/Contents

Unit 1: JDBC **(08L)**
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, ResultSet, 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** (06L)

    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** (05L)

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

Unit 5: **Networking** (05L)

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

Unit 6: **Java Beans and RMI Java Beans** (08L)

    6.1 What is Bean?
    6.2 Advantages
    6.3 Using Bean Development Kit(BDK)
    6.4 Introduction to Jar and Manifest Files
    6.5 The java beans API
    Remote Method Invocation
    6.6 Introduction to Remote Object RMI architecture
    6.7 Stubs and Skeleton
    6.8 Registry
    6.9 Setting up RMI
    6.10 Using RMI with Applet

Unit 7: **Web Services** (08L)

    7.1 Introduction to Web Services
    7.2 Types of Web Services
    7.3 REST
       What is REST?
       REST Oriented Architecture, Building Web Services,Publishing
       Web Services

Extra reading:

1. Introduction to Hibernate
2. Advantages of Hibernate compared to JDBC
3. ORM (Object Relational Mapping)
4. Configuration xml file and Mapping xml file along with dtds.
5. Hibernate architecture
6. Installation and Directory Structure
7. Hibernate Data Types.
8. First Application using Hibernate.

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

Class: SYBBA (C.A) (Sem IV)   **Subject**: BBA (C.A)

Course: Advanced Java   **Course Code:** BCA2401

Weightage: 1= weak or low relation, 2= moderate or partial relation, 3= strong or direct relation

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	2	3					2	2		
CO2	3	2	3					2	2		
CO3	3		1					2	2		
CO4	3	2	3					2	2		
CO5	3	2	3					2	2		
CO6	3	2	3					2	2		

PO1. Knowledge:
All of the course outcomes (COs) strongly contribute to the development of students'disciplinary knowledge in Advance Java.
CO1 needs student deeply understand to build connection using Java Database connectivity. CO2, requires understanding of multithreading and able to use thread synchronization.CO3, CO4, CO5 require students to master advanced concepts of Dynamic Web Page developmentusing Servlet, and JSP.
CO6 -Student should neatly understand basics of the socket programming and itsimplementation.

PO2. Problem Analysis:
CO1, CO2, CO4, CO5, CO6 moderately contribute as, CO1, CO2 requires student to implement problems using JDBC and multithreading.
CO4, CO5 needs students to analyze critically the problems based on web development and implement it. CO6 needs to solve the problems based on socket programming.

PO3. Design and Development:
CO1, CO2, CO4, CO5, CO6 strongly contributes to program outcome Design andDevelopment as CO1 needs student to design and develop database applications with JDBC. CO2, CO4, CO5 requires student to design and develop applications using multithreading,Java Server Pages and Servlets. CO6 needs to design and Develop Client Server based Socket Programs.CO3 has low relation with PO3 to utilize concept of Java Server Pages.

PO8. Life-Long Learning:
All Cos moderately contribute to recognize the need for lifelong learning in thecontext of technology development.

PO9. Project Management:
All COs contribute to the development of project development and management skills usingall advance java tools and technology.

Academic Year 2020-2021

Name of the Programme: BBA (Computer Application)

Class	: S.Y.BBA (C.A.) (Semester - IV)
Paper Code	: BCA2402

    Title of Paper: Advanced Web Technologies

Credit: 3   **No. of. Lectures: 48**

A] Course Objectives:

- To know & understand concepts of internet programming.
- Understand how server-side programming works on the web.
- Understanding How to use WordPress.
- Utilize Object-Oriented PHP and design patterns to make code more scalable and maintainable.
- To develop Application of AJAX in web application.
- Manage the relationship between cookies and sessions.

B] Course Outcomes:

By the end of the course, students will be able to:
    CO1. Understand and implement object-oriented features of PHP programming.
    CO2. Illustrate AJAX and web services to develop interactive web applications.
    CO3. Students will able to analyze the construction of a web page and relate how PHP and XML
          combine to produce the web page.
    CO4. Students will able to combine Ajax with PHP.
    CO5. Develop fast and scalable application combining the power of Ajax and PHP.
    CO6. Dynamically access and update PHP applications using XML.
    CO7. Students will able to develop interface a PHP script with a MySQL database.

                    Topics/Contents

Unit 1:   **Introduction to PHP**   **(08L)**

1.1 Installation of XAMP/LAMP

1.2 What does PHP do?

1.3 Lexical Structure

1.4 Language Basics

      1.4.1 Data Types ,Variable, Constant, Keywords

      1.4.2 Control Structures

      1.4.3 Type Casting, Type Juggling

1.5 $_GET, $_POST,$_REQUEST Variables

1.6 Defining and Calling a Function

1.7 Default Parameters, Variable Parameters,
   Missing Parameters

1.8 Variable Function, Anonymous Function

1.9 Types of Strings in PHP

1.10 Encoding and Escaping

1.11 Manipulating and Searching Strings

1.12 Arrays
   1.12.1 Indexed Vs. Associative Arrays
   1.12.2 Identifying Elements of an Array
   1.12.3 Traversing Arrays
   1.12.4 Sorting

Unit 2:   **Web Techniques**   **(06L)**

2.1 Web Variables

2.2 Server Information

2.3 Self-Processing Forms

2.4 Setting Response Headers

2.5 Maintaining State (Cookies and Sessions)

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

3.1 Using PHP to Access a Databases

3.2 MySQL Database Functions

3.3 Relational Databases and SQL

3.4 PEAR DB Basics

3.5 Advanced Database Techniques

3.6 Sample Application

Unit 4:   **XML**   **(08L)**

4.1 What is XML?

4.2 XML Document Structure

4.3 PHP and XML

4.4 XML Parser

4.5 The Document Object Model

4.6 The simple XML Extension

4.7 Changing a Value with Simple XML

Unit 5:   **Web Services**   **(06L)**

5.1 Web Services Concepts

5.2 WSDL, UDDI

5.3 Introduction to SOAP XML-RPC

5.4 Creating Web Services

5.5 Calling Web Services

Unit 6:   **Ajax**   **(06L)**

6.1 Understanding Java Scripts for AJAX

6.2 AJAX Web Application Model

6.3 AJAX –PHP Framework

6.4 Performing AJAX Validation

6.5 Handling XML Data using PHP and AJAX

6.6 Connecting Database using PHP and AJAX

Unit 7:   WordPress   (06L)

7.1 Installing WordPress

7.1.1 Uploading WordPress to your Web Server

7.1.2 Installing WordPress

7.1.3 Database Connectivity

7.1.4 Theme Customization

7.2 Configuring WordPress

7.2.1 Using the WordPress Dashboard

7.2.2 Managing Content in the WordPress Dashboard

7.2.3 Types of Users

7.2.4 The WordPress Settings Panel

7.2.5 Reading and Writing Settings

7.2.6 Permalinks and RSS Feeds

7.2.7 Creating and Managing Posts

7.2.8 Setting up Post Categories

7.2.9 Creating and Managing Pages

7.2.10 Managing Comments

7.2.11 Installing and Updating Plugins

7.2.12 Customizing WordPress Theme

7.2.13 WordPress Theme Options

Extra Reading:

Angular 8

1.1 Angular 8 Installation

1.2 Create an app

1.3 Angular 8 Architecture, Components,

1.4 Directives-ngIf Directive, *ngFor Directive, ngSwitch Directive

1.5 Data Binding in Angular 8

1.6 Property Binding in Angular 8

1.7 String Interpolation

1.8 Event Binding

1.9 Two way Data Binding

1.10 Angular 8 Forms

Reference Books:

1. Programming PHP - Rasmus Lerdorf and Kevin Tatroe, O'Reilly publication
2. Beginning PHP 5 - Wrox publication
3. PHP web services - Wrox publication
4. WordPress 5 Complete Seventh Edition – Karol Krol
5. https://www.javatpoint.com/angular-8
6. Angular JS Tutorial - tutorialspoint.com by K. K. Panigrahi

Class: SYBBA (C.A) (Sem IV)   **Subject**: BBA (C.A)

Course: Advanced Web Technologies   **Course Code**: BCA2402

Weightage: 1= weak or low relation, 2= moderate or partial relation, 3= strong or direct relation

Course Outcomes	Programme Outcomes (POs)										
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	1	2		1		1		2		
CO2	3				2			2	2		
CO3			2						2		
CO4	1								2		
CO5	2		3						2		
CO6			3					2	2		
CO7		1	3		1		2	3	2		2

PO1. Knowledge:
CO1, CO2, and CO4,CO5 are fairly mapped in terms of students Learn how to use the object-oriented features of PHP programming to create scalable, quick applications that combine the strengths of Ajax and PHP.

PO2. Problem Analysis:
CO, CO7 slightly mapped since students may apply object-oriented ideas and evaluate Databases.

PO3. Design and Development:
CO1, CO5, CO6, and CO7 Mapped rather well for the analysis, design, implementation, and testing of web applications.

PO4.Conduct investigations of complex problems:
CO3 Moderately mapped as Students will able to analyze the construction of a web page and relate how PHP and XML combine to produce the web page.

PO5. Modern Tool Usage:
CO1, CO2, CO7 Slightly mapped as students use notepad, sublime editor's web browsers, Apache web server, XAMP, MySQL for design and execute the server-side PHP scripts interacting with database

PO7. Individual and Team Work:
CO1, CO7 Moderately mapped as students analyze, design, implement and test web Applications in team.

PO8. Life-Long Learning:
CO2, CO6, CO7 Moderately mapped as student able to develop interactive web applications and help to develop interface a PHP script with a MySQL database.

PO9. Project Management:
All COs contribute to the development of project development and management skills using all advance java tools and technology.

PO11. Innovation, employability, and Entrepreneurial skills:
CO7. Moderately mapped since students can create an interface between a MySQL database and a PHP script.

Name of the Programme : BBA(Computer Application)
Class   : S.Y.BBA (C.A.) (Semester – IV)
Paper Code   : BCA2403
   Title of Paper: Mathematical Foundation of Data Science

Credit: 3   **No. of. Lectures: 48**

A] Course Objectives:
1. Learn to work with infinite sequences and series.
2. To understand the ideas of the basis step and the inductive step in a proof by mathematical induction.
3. To provide detailed of matrices which is applied for solving system of linear equations and useful in various fields of technology.
4. Learn to compute determinants and know their properties.
5. Work with matrices and determine if a given square matrix is invertible.

B] Course Outcomes:

By the end of the course, students will be able to:
CO1. Identify the base case, induction hypothesis, and inductive step in an induction argument, to prove statements using mathematical induction.
CO2. Basic knowledge of functions and relations concepts.
CO3. Construct simple mathematical proofs and possess the ability to verify them.
CO4. Apply the knowledge of matrices to solve the problem.
CO5. Utilize applications of matrices to solve industrial problem.
CO6. Able to find the inverse of a square matrix and solve the matrix equation Ax = b using row operations and matrix operations.
CO7. Able to find the determinant of a product of square matrices, of the transpose of a square matrix, and of the inverse of an invertible matrix.

Topics/Contents

Unit 1:   Fundamentals   **(12L)**
            1.1 Approximation
            1.2 Functions
            1.3 Summation

            1.4 Series Approximation
            1.5 Induction

Unit 2:   Linear Algebra   **(12L)**

            2.1 Vectors and Matrices
            2.2 Scalar & Tensor

2.3 Addition & Multiplication of Matrices
2.4 Norms
2.5 Linear Independence
2.6 Special Kinds of Matrices – Diagonal, Symmetric, Orthogonal
2.7 Identity Matrices
2.8 Inverse of Matrices
2.9 Determinant

Unit 3:   **Calculus**   **(12L)**
3.1 Differentiation
3.2 Integration
3.3 Functions of Several Variables
3.4 Series Approximations

Unit 4:   **Gradient Descent**
                                                                  (12L)
4.1 Functions
4.2 Gradients
4.3 Gradient Descent - Learning Rate
4.4 Fitting a Model to Data
   - Least Mean Squares Updates for Regression
   -Decomposable Functions

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, BarbaraHubbard

Class: SYBBA (C.A) (Sem -IV)   **Subject**: BBA (C.A)

Course: Mathematical Foundation of Data Science   **Course Code**: BCA2403

Weightage: 1= Weak or Low Relation, 2= Moderate or Partial Relation, 3= Strong or Direct

Justification:

Course Outcomes	Programme Outcomes (POs)										
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	3		2			2	2			
CO2	3	3		2			2	2			
CO3	3	3		2			2	2			
CO4	3	3		2			2	2			
CO5	3	3		2			2	2			
CO6	3	3		2			2	2			
CO7	3	3		3			2	2			3

PO1. **Knowledge**

CO1, CO2, CO3, CO4, CO5, CO6 and CO7 are strongly mapped as student will get the knowledge about Sequence, series, mathematical induction, Set theory, Functions, Relations Concept, Matrices.

PO2. **Problem Analysis**

CO1, CO2, CO3, CO4, CO5, CO6 and CO7 are strongly mapped as student will do problem Analysis.

*PO4.***Conduct investigations of complex problems**

CO1, CO2, CO3, CO4, CO5, CO6 are moderately mapped and CO7 is strongly mapped. Student will be able to solve complex and real-life problems.

PO7. **Individual and Team Work: CO1 is strongly**

CO1, CO2, CO3, CO4, CO5, CO6 and CO7 are moderately able to work effectively as an individual, and as a member or leader as per need in, multidisciplinary teams.

PO8. **Life-Long Learning:**

CO1, CO2, CO3, CO4, CO5, CO6 and CO7 are moderately Recognize the need and have the ability to engage in Independent continuous reflective learning in the context of technological advancement.

PO11. **Innovation, employability, and Entrepreneurial skills:**

 CO7 is Strongly Identify opportunities, and pursue those opportunities to create value and wealth for the betterment of the individual and society at large.

Name of the Programme : BBA(Computer Application)
Class   : S.Y.BBA (C.A.) (Semester -
IV)Paper Code : BCA2404
   Title of Paper: Software Testing & Quality Assurance

Credit: 3   **No. of. Lectures: 48**

A] Course 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.

6. To know in details testing and tools used for automation testing

7. To Understand white box, block box, object oriented and web based Testing

B] Course Outcomes:
   By the end of the course, students will be able to:

   CO1. Explain the fundamentals of software testing and automation
   CO2. Analyze the design of test cases for different testing techniques.

   CO3. Create test strategies and plans, design test case, prioritize and execute them
   CO4. Test the software by applying testing techniques to deliver a product free from
   bugs.
   CO5. Illustrate the significance of software testing and object oriented techniques.
   CO6. Demonstrate the quality management, assurance, and quality standard to software
   system.
   CO7. Understand and use software test automation tools.

   Topics/Contents

Unit 1:   Software Testing   (06L)

    1.1 Introduction
    1.2 Nature of Errors
    1.3 Testing Principles & Testing Fundamentals
    1.4 Debugging

Unit 2:   Approaches to Testing – I   (10L)

    2.1 White Box Testing
    2.2 Black Box Testing
    2.3 Gray Box Testing
    2.4 Unit Testing
    2.5 Integration- Top-down ,Bottom Up, Big Bang
       ,Sandwich

Unit 3:   Testing for Specialized Environments   (08L)
    3.1   Testing GUI's
    3.2   Testing of Client/Server Architectures
    3.3   Testing Documentation and Help Facilities
    3.4   Testing for Real- Time Systems

Unit 4:   Software Testing Strategies   (08L)
    4.1 Validation Testing
    4.2 System Testing
    4.3 Verification
    4.4 Performance Testing
    4.5 Regression Testing
    4.6 Agile Testing
    4.7 Acceptance Testing
    4.8 Smoke Testing
    4.9 Load Testing

**Unit 5:   Specialized Testing & Automated Testing
Tools(Introduction)   (06L)**

    5.1 Test Case Design,
    5.2 Junit
    5.3 Apache Jmeter
    5.4 Winrunner
    5.5 Load runner
    5.6 Rational Robot
    5.7 Ranorex
    5.8 Headpin,
    5.9 Sqish
    5.10 QTP

Unit 6:   **Software Quality Assurance Fundamentals**   **(10L)**

6.1 Definition of Quality, QA,QC,SQA

6.2 SQA Planning & Standards

6.3 SQA Activities

6.4 Building Blocks of SQA

6.5 Quality Factors,

6.6 Software Quality Assurance Metrics –

    6.6.1 Measurement Software Quality Metrics

    6.6.2 Product Quality Metrics

    6.6.3 In-Process Quality Metrics

    6.6.4 Metrics for Software Maintenance

Reference Books:

1. Software Engineering – A Practitioners Approach, Roger S. Pressman, TataMcGraw Hill
2. Software Engineering for Students- A Programming Approach,Douglas Bell, Pearson Education
3. Software Quality Assurance by Daniel Galin, PearsonPublication,2009
4. www.opensourcetesting.org

Class: SYBBA (C.A) (Sem -IV)   **Subject**: BBA (C.A)

Course: Software Testing & Quality Assurance   **Course Code**: BCA2404

Weightage: 1= Weak or Low Relation, 2= Moderate or Partial Relation, 3= Strong or Direct

Course Outcomes	Program Outcomes(POs)										
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3							2		2	
CO2	3	3						2		2	
CO3	3		2	3			2	2		2	
CO4	3			2			3	2		2	
CO5	3			2				2		2	
CO6	3	2						2		2	
CO7	3				3	3	3	2	2	2	3

All of the course outcomes (COs) contribute to the development of students' disciplinary knowledge in Computer Application.
PO1. **Knowledge:**

In CO1, CO2, CO3, CO4, CO5, CO6 and CO7 Strongly mapped as the student will able to get knowledge of testing technique is applied,
problem is to be analyzed and appropriate testing techniques is chosen, testing tools are explored and applied by making test plan, strategies and by giving priority to the test module as per requirement, to apply different testing techniques to deliver a product free from bugs, illustrate the significance of software testing and object oriented techniques, to demo quality assurance models help to analyze the software product for quality benchmarks.

PO2. **Problem Analysis:**
CO2 Strongly mapped as the student will able to get knowledge of problem is to be analyzed and appropriate testing techniques is chosen and CO6
Is moderately mapped as a student will able to get formal inspections are done for analysis purpose.

PO3. **Design and Development:**
CO3 moderately mapped as the students will be able to create test strategies and plan the design cases, prioritize and execute that test cases as per the priority.

PO4. **Conduct investigations of complex problems:**
CO 3 Strongly mapped as student will able be get that this is essentially a mechanism for investigation of complex problem by making test plan, test cases to produce defect free application. CO4 and CO5 moderately mapped as student will able be get that this is essentially a mechanism for investigation of complex problem by applying different testing techniques to deliver defect free application and illustrate the significance of software testing and object oriented techniques.

PO5 **.Modern Tool Usage:**
CO7 is strongly mapped as students will be able to understand and get use of software testing automation tools.

PO6. **Ethics and Social Responsibility:**
CO7 strongly mapped as students will able to use testing automation tools to make bug free software to for serving the society.

*PO7.***Individual and Team Work:**
CO3 is moderately mapped as the student will be able to test various real time defect in application individually and in a team CO4 and CO7 are strongly mapped as the student will be able to apply different testing techniques to the application individually and in a team and use the software automation tools.

PO8. **Life-Long Learning:**
In CO1,CO2,CO3,CO4, CO5, CO6 and CO7 moderately mapped as the student will able to get details of fundamentals of software testing and automation , to conduct testing by applying various types of testing techniques to solve real time problem regarding software applications, to conduct testing by applying various types of testing techniques to solve real time problem regarding software applications by creating test strategy, plan and test cases and by applying various types of testing techniques to solve real time problem regarding software applications. Moderately mapped as the student will able to illustrate the significance of software testing by applying object oriented techniques and to recognize the need of Quality standard to software for life-long learning.

*PO9.***Project Management**
CO7 moderately mapped as the students will be able to get the detailed about project management as by using testing automation tools.

PO10. **Communication**
In CO1,CO2,CO3,CO4, CO5, CO6 and CO7 moderately mapped as the student will able to apply various testing techniques through the communication with client as per his requirement.to deliver a product free from bugs.

PO11. **Innovation, employability, and Entrepreneurial skills:**
CO7 strongly mapped as students will able to make a use of automation tools for providing bugs free software to work ethically and to open a doors of variety of opportunities with the current trends in IT regarding test automation tools.

SYLLABUS (CBCS) FOR S.Y.BBA (C.A.) (w. e. from June, 2020)

Academic Year 2020-2021

Name of the Programme : BBA(Computer Application)
Class   : S.Y.BBA (C.A.) (Semester -
IV)Paper Code   : BCA2405
   Title of Paper: Networking
Credit: 3   **No. of. Lectures: 48**

A] Course Objectives:

1. To understand various computer networks and technologies behind networks
2. To study different types of modern network architecture.
3. To learn ISO model and TCP/IP suits
4. To Discuss various transmission medium for solving communication problems.
5. To understand and solve Error detection and correction problem.
6. To study routing concept along with Routing protocols
7. To be familiar with network security concepts.

B] Course Outcomes:
By the end of the course, students will be able to:

CO1. Understand the major concepts involve in various types of computer networks (LAN,

MAN, WAN) and technologies behind networks.
CO2. Develop an understanding of modern network architecture from a design and
performance.
CO3. Discuss the importance of ISO reference model and TCP/IP Suite.
CO4. Apply the knowledge of different network design and various logical models of networking to solve problems of communication over different transmission medium.
CO5. Get knowledge of various error detection and correction technique to avoid collision and error problem.
CO6. Analyze various routing concepts with routing protocol to develop network related
application for future need.
CO7. Utilize the knowledge of different type of network security to solve the complex problem related to network security.

Topics/Contents

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

1.1 Overview of Basic Concepts and Components.
Data Communication Characteristic, Data
Representation,Data Flow, Network Criteria,
Physical Structures andTopologies, 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. ConnectionlessN/W's

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)   **(08L)**

Unit 3:   Link Layer Communication

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 –
     SimpleMail 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 Abndrew S. Tanenbaum4e

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. Internetworking Technology Handbook CISCO System

6. Computer Networks and Internets with Internet Applications Douglas Comer

Weightage: 1= weak or low relation, 2= moderate or partial relation, 3= strong or direct relation

Course Outcomes	Programme Outcomes (POs)										
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO 1	3										
CO 2	3		2		3						
CO 3	3							3			
CO 4	3			2						2	
CO 5	3	3									
CO 6	3				1			1			
CO 7	3			2		2					3

PO1. **Knowledge:**
All of the course outcomes (COs) contribute to the development of students disciplinary knowledge in Computer Networking. In CO1, CO2 CO3 CO4 CO5 CO6 CO7 Strongly mapped with concepts of various types of computer network also get knowledge of ISO,TCP/IP models , various communication medium, protocols, error detection and correction techniques and different types of network security .

PO2. **Problem Analysis:**
CO5 Strongly mapped to analyze error detection and error correction problems of data link layer
 to communicate effectively within network.

PO3. **Design and Development:**
CO2 Moderately mapped to develop an understanding of modern network architecture from a design and performance.

PO4. **Conduct investigations of complex problems:**
CO4 and CO7 Moderately mapped to research methods and analyze designs of data transmission medium. And also analyze different technique and propose solution to network security related problem.

PO5. **Modern Tool Usage:**
CO2 Strongly mapped to apply modern networks architecture techniques and propose solution to real world problem. CO6 Slightly mapped to formulate complex network Application problems. Analyze various Routing Concepts with routing protocol to develop network related application for future need.

PO6. **Ethics and Social Responsibility:**
CO7 Moderately mapped to discuss importance of social responsibility and provide knowledge of network security for effective and accurate communication.

PO8. **Life-Long Learning:**
CO3 Strongly mapped to lifelong learning. Discuss the importance of ISO reference model and TCP/IP Suite. And CO6 Slightly mapped to Independent and lifelong Learning. Analyze various Routing Concepts with routing protocol to develop network related application for future need.

***PO10*. Communication:**

CO4 Moderately mapped to use communication medium and various logical models of networking to effectively communicate with different type of network.

***PO11*. Innovation, employability, and Entrepreneurial skills:**

CO7 Strongly mapped as student will able to get opportunities in various network fields like cyber security, Network security etc.

Academic Year 2020-2021

Name of Programme : BBA(Computer Application)
Class: S.Y.BBA (C.A.) (Semester - IV)
Paper Code: BCA2406
Title of Paper: Computer Laboratory based on (BCA2401 and BCA2402)
Credits: 02   No of Lectures: 48

Learning Objectives –

1. To Learn the advanced concepts of Java Programming
2. To Learn the design and develop web application using Java
3. To Learn Network programming using Java
4. To develop a web application using java technologies
5. To create fully functional website/web application using Java script, PHP,XML etc.
6. To develop an ability to design and implement static and dynamic website
7. To handling Cookies and Sessions using PHP, SERVLETS and JSP

Learning Outcomes-
By the end of the course, students will be able to:

CO1. Learn to access database using JDBC in Java
CO2. Develop Dynamic Web Pages using Servlet & JSP
CO3. Develop client server applications using SOCKET Programming
CO4. Understand the construction of webpages & relate to PHP & XML.
CO5. Design interactive programs using AJAX & PHP, XML.
CO6. Design interactive website using Wordpress.
CO7. Develop user interface based application.

List of Assignment:
1. Assignment on Java JDBC
2. Assignment on Multithreading
3. Assignment on Servlet
4. Assignment on JSP
5. Assignment on Networking – Socket Programming
6. Assignment on Spring & Hibernet
7. Assignment on OOPs Concept in PHP
8. Assignment on Sticky Forms
9. Assignment on Server Information
10. Assignment on XML
11. Assignment on DOM XML
12. Assignment on Ajax Using PHP
13. Assignment on Ajax using XML
14. Assignment on Wordpress
15. Assignment on Webserver using Wordpres

Class: SYBBA (C.A) (Sem IV)   **Subject**: BBA (C.A)
Course: Computer Laboratory based on (BCA2401 and BCA2402)   **Course Code**: BCA2406

  Weightage: 1= weak or low relation, 2= moderate or partial relation, 3= strong or direct relation

Course Outcomes	Programme Outcomes (POs)										
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	3					2				2
CO2	3	3	3				2				2
CO3	3	3	2								2
CO4	3	3	3		2						2
CO5	3	3	3	3	3						2
CO6	3	3	3	3	3						2
CO7	3		3	3							2

All of the course outcomes (COs) contribute to the development of students disciplinary knowledge in Computer Application.

PO1. Knowledge:

In CO1, CO2, CO3, CO4, CO5, CO6 and CO7 Strongly mapped as the student will develop the deep understanding of Advance java and Advanced Web Technologies concepts.
In Advance Java Lab Manual Student will learn JDBC database connection, Dynamic web page creation using servlet and JSP, develop client server application using socket programming.
In Advanced Web Technologies student will develop the deep understanding of basic concept in development of webpages using PHP & XML

PO2. Problem Analysis:

In CO1, CO2,CO3,CO4,CO5,CO6 Strongly mapped as the student analyze assignment problems on JDBC connection, dynamic web page creation and solving client server application in advance java programming. The Students will apply their knowledge to evaluate real life problems using PHP, XML.

PO3.Design and Development:

In CO2, CO5, CO7 strongly mapped as the student developed dynamic web pages and In CO3 moderately mapped as student developed client server application using socket programming.
CO4 CO5 CO6 and CO7 Strongly mapped as the students will be able to develop PHP, XML Web Pages.

*PO4.*Conduct investigations of complex problems:

 CO5 CO6 CO7 Strongly mapped as the students will be able to understand and apply the programing skills for solving problems of displaying various types of information in the webpages using Word press, Ajax & PHP.

PO5.Modern Tool Usage

CO4 CO5 CO6 CO7 strongly & moderately mapped as the use of modern tool for solving various real life problems by PHP, Ajax.

PO7: Individual and Team work:

In CO1, CO2, CO5 moderately mapped as student will work on database using JDBC connection, dynamic web page creation and student create the test cases and test the different webpages using web element methods and locators

PO11: Innovation, employability, and Entrepreneurial skills:

In CO1, CO2, CO3, CO4, CO5, CO6, CO7 moderately mapped as student will get different opportunities in various fields in IT.

Academic Year 2020-2021

Name of Programme : BBA(Computer Application)
Class: S.Y.BBA (C.A.) (Semester - IV)
Paper Code: BCA2407
Title of Paper: Computer Laboratory based on(BCA2404 and BCA2405)
Credits: 02 **No of Lectures: 48**

Learning Objectives –

1. To describe strategies for generating system test cases.
2. To Build the test cases and execute them.
3. To discuss the distinctions between validation testing and defect testing.
4. To understand the essential characteristics of tool used for test automation
5. To be familiar with CISCO Packet Tracer.
6. To study Routing concepts with Packet Tracer.
7. To understand knowledge of wireless concepts and protocols.

Learning Outcomes-
By the end of the course, students will be able to:

CO1. Understanding Selenium and TestNG tool to perform Automation testing
CO2. Design Effective test cases that can uncover ethical defects in the applications.
CO3. Construct and test simple programs.
CO4. Learn routing concepts along with protocols.
CO5. Understand and develop various applications on packet tracer.
CO6. Understand network devices, IP, Commands & Switching techniques.
CO7. Learn routing concepts along with protocols.

Assignments
1. Assignment on methods of Web driver
2. Assignment on methods of Web elements ,Locators
3. Assignment on handling web elements available on Google webpage
4. Assignment on how to handle Gmail account and Facebook account.
5. Assignment on Find total no. of links available on web page.
6. Assignment on handling window popup and alert popup
7. Assignment on selecting radio buttons and check box
8. Assignment on handling I frames, Scroll Bar
9. Assignment on handling list box web element
10. Assignment on TestNG Framework– TestNG Installation, TestNG XML Files, TestNG Annotations
11. Assignment on Basic Network Command and Network Configuration Command
12. Assignment on Initial Switch Configuration
13. Assignment on Initial Router Configuration

14. Assignment on FTP server Configuration on Packet Tracer
15. Assignment on Email server Configuration on Packet Tracer
16. Assignment on DHCP Configuration
17. Assignment on RIP Protocol Configuration
18. Assignment on HTTP Web Server Configuration on Packet Tracer
19. Assignment on Static Routing Configuration on Packet Tracer
20. Assignment on Different Type of network cable and Practical implementation of cable
21. Assignment on wireless Router Configuration on Packet Tracer
22. Assignment on DNS Server Configuration in Packet Tracer
23. Assignment on VLAN Configurations

Class: SYBBA (C.A) (Sem IV)　　　　　　　　　**Subject**: BBA (C.A)
Course: Computer Laboratory II (Based on BCA2404 & BCA2405)　**Course Code**: BCA2407

Weightage: 1= weak or low relation, 2= moderate or partial relation, 3= strong or direct relation

Course Outcomes	Programme Outcomes (POs)										
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	3	-								2
CO2	3	3	3				2				2
CO3	3	3	-								2
CO4	3	3	3								2
CO4	3	3	3		3						2
CO5	3	3	3		3						2
CO6	3	3	3		3						2

PO1. Knowledge:
All of the course outcomes (COs) contribute to the development of students' disciplinary knowledge in Computer Application.
In Software testing and Automation Lab manual student will learn basic concepts of automation testing, take the deep knowledge of writing test cases and find out the defects and various Networking Tools.

PO2. Problem Analysis:
All of the course outcomes (COs) contribute to the development by analyzing to problem.
CO1 CO2 CO3 CO4 CO5 CO6 and CO7 Contribute to the development of students' problem Analysis, thinking skills and problem-solving skills. It is strongly mapped as the usage of various networking tools. Student can analyze assignment problem on methods of Web driver, web elements, Locators.

PO3. Design and Development:
All of the course outcomes (COs) contribute to the development by analyzing to problem.
CO2 CO4 CO5 CO6 and CO7 Strongly mapped as the students will be student will design effective test cases and cover the defects usage of various networking tools.

PO5.Modern Tool Usage
CO4 CO5 CO6 CO7 strongly & moderately mapped as the use of modern tool for solving various real life problems by Testing Tools & Networking.

PO7. Individual and Team work:
In CO2 moderately mapped as student will work on creating the test cases and test the different webpages using web element methods and locators

PO11. Innovation, employability, and Entrepreneurial skills:
All COS relate to employability skills as students are Able to analyze and evaluate problems by using various testing and networking tools.

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

Paper Code   **: PR-22**   **Title of Paper: Project**

Credit: 4   **No. of. Lectures: 48**

A] Course Objectives:

1. To introduced project planning.
2. To examine the stages of project planning: Scoping, Execution, 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] Course Outcomes:
By the end of the course, students will be able to:

CO1. Understand programming language concepts, specifically web technologies, Java and object-oriented concepts and apply it in problem solving.

CO2. Learn the software development cycle and on different processes - requirements, design, and implementation phases.

CO3. Identify, plan, analyze, design and implement software project required in society.

CO4. Take initiatives, communicate, work in a team and manage a project within a given time span.

CO5. Demonstrate the ability to find and use the technical information from multiple sources.

CO6. Handle power point presentations creatively.

CO7. Empower themselves to present project report and communicate effectively.

Evaluation:

External Evaluation	Marks
Project Report	30
Power Point Presentation	10
Viva	20
Project Logic	20
Project Demonstrations	20
Total	**100**

Class: SYBBA (C.A) (Sem V)   **Subject**: BBA (C.A)
Course: Project   **Course Code**: PR-22
Weightage: 1= weak or low relation, 2= moderate or partial relation, 3= strong or direct relation

Course Outcomes	Programme Outcomes (POs)										
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO 1	3		2						3		
CO 2		3	2						3		
CO 3		3	2						3		
CO 4		3	2						3		
CO 5			2		2			3	3		
CO 6			2						3		
CO7			2	3			2		3		
CO8			2		3				3		3

PO1. **Knowledge:**

 CO1 Strongly mapped as the student will develop the deep understanding of flow of System to be

designed and developed.

PO2. **Problem Analysis:**

CO2 CO3 CO4 Contribute to the development of students' problem analysis, thinking skills and problem-solving skills. it is Moderately mapped as the Students will apply their knowledge to understand they system and project development

PO3. **Design and Development:**

CO1 CO2, CO3 CO4CO5 CO6 CO7 CO8 moderately mapped as the students will be able to design develop, test and work on multidisciplinary Problems in project development

*PO4.***Conduct investigations of complex problems:**

CO7 strongly mapped as student will be able to conduct the investigation and of real word data and design and develop user interfaces for real world scenario.

PO5. Modern Tool Usage:

CO 8 strongly mapped student will develop different applications Using modern computing tool and frameworks.CO5 moderately mapped as student will engage themselves in learning of project management

PO8. **Life-Long Learning:**

CO5 strongly mapped as student will engage themselves in learning of project management as it contributes to the development of students' ability to engage in life-long learning as real life data management

PO9. Project Management:
CO1 CO2, CO3 CO4CO5 CO6 CO7 CO8 strongly mapped as student can create software's and learn the complete lifecycle of project management

PO11. **Innovation, employability, and Entrepreneurial skills:**
CO8 strongly relate to employability skills as students should be able to design and construct a hardware and software system, component, or process to meet desired needs.