



# Shri Vaishnav Vidhyapeeth Vishvavidhyalaya, Indore

## Shri Vaishnav Institute of Computer Applications

**Name of Program: BCA+MCA**

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BCCA601	Compulsory	Advanced Java	3	1	0	4	60	20	20	0	0

**Legends:** L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit;

Q/A – Quiz/Assignment/Attendance, MST - Mid Sem Test.

\***Teacher Assessment** shall be based on following components: Quiz/Assignment/Project/Participation in class (Given that no component shall exceed 10 Marks)

### Course Education Objectives (CEOs):

This course covers the implementation of advanced program designs with the tools available in the Java programming language. After a detailed review of the fundamentals, advanced topics will include the Graphical User Interface (GUI) for applications, 2D graphics, multimedia, multithreading and client-server models for networking and database connectivity. If time and interest permits, the class may introduce the Java tools for generics and collections.

### Course Outcomes (COs):

Students will build on their understanding of Object-Oriented Design (OOD) and Programming (OOP) in Java and learn to write robust, Graphical User Interface (GUI) applications and applets. Students will gain a practical familiarity with 2D graphics, multimedia, programming for concurrency, networking and database connectivity. Students may investigate programming for Web Services, if time and interest permits.

### Syllabus:

#### UNIT – I

Java Networking: Network Basics and Socket overview, TCP/IP client sockets, URL, TCP/IP server sockets, Datagrams, java.net package Socket, ServerSocket, InetAddress, URL, URLConnection.

JDBC Programming: The JDBC Connectivity Model, Database Programming: Connecting to the Database, Creating a SQL Query, Getting the Results, Updating Database Data, Error Checking and the SQLException Class, Statement Interface, PreparedStatement, CallableStatement, ResultSet Interface, Updatable Result Sets, JDBC Types, Executing SQL Queries, Executing SQL Updates.



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### UNIT - II

Servlet API and Overview: Servlet Model: Overview of Servlet, Servlet Life Cycle, HTTP Methods Structure and Deployment descriptor ServletContext and ServletConfig interface, Attributes in Servlet, Request Dispatcher interface The Filter API: Filter, FilterChain, Filter Config Cookies and Session Management: Understanding state and session, Understanding Session Timeout and Session Tracking, URL Rewriting.

### UNIT – III

Java Server Pages: JSP Overview: The Problem with Servlets, Life Cycle of JSP Page, JSP Processing, JSP Application Design with MVC, JSP Directives, JSP Action, JSP Implicit Objects, JSP Form Processing, JSP Session and Cookies Handling, JSP Session Tracking JSP Database Access, JSP Standard Tag Libraries, JSP Custom Tag, JSP Expression Language, JSP Exception Handling, JSP XML Processing.

### UNIT – IV

Java Server Faces2.0: Introduction to JSF, JSF request processing Life cycle, JSF Expression Language, JSF Standard Component, JSF Facelets Tag, JSF Converter Tag, JSF Validation Tag, JSF Event Handling and Database Access.

### UNIT – V

Hibernate4.0: Overview of Hibernate, Hibernate Architecture, Hibernate Mapping Types, Hibernate O/R Mapping, Hibernate Annotation.

Java Web Frameworks: Spring MVC: Overview of Spring, Spring Architecture, bean life cycle, XML Configuration on Spring, Aspect – oriented Spring, Managing Database, Managing Transaction

### Text Books:

1. Patrick Naughton and HerbertzSchildt, “Java-2: The Complete Reference”, TMH, 7<sup>th</sup> edition, 2002.
2. Jim Keogh, “J2EE: The complete Reference”, McGraw-Hill Education (India) Pvt Limited, Edition 1.
3. Rick Darnell, “HTML 4 unleashed”, Techmedia Publication, 2000
4. Paul Dietel and Harvey Deitel, “Java How to Program”, PHI, 8<sup>th</sup> edition, 2010.

### Reference Books:

1. E. Balagurusamy, “Programming with Java: A Primer”, TMH, 1998.
2. N.P. Gopalan and J. Akilandeswari, “Web Technology- A Developer’s Perspective”, PHI, 2<sup>nd</sup> edition
3. Eric Jendrock, Jennifer Ball, Debbi Carson, “The Java EE5 Tutorial”, Pearson, 3<sup>rd</sup> edition, 2007.



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BCCA602	Compulsory	Internet Programming	3	1	0	4	60	20	20	0	0

**Legends:** L – Lecture; T – Tutorial/Teacher Guided Student Activity; P – Practical; Q/A – Quiz/Assignment/Attendance; MST – Mid Semester Test.

\***Teacher Assessment** shall be based on following components: Quiz/Assignment/Project/Participation in class activities, given that no component shall exceed more than 10 marks

### Course Education Objectives (CEOs):

- The goal of this course is to know & understand concepts of internet programming.

**Course Outcomes (COs):** Students will be able to understand:

- Java programming concepts
- JAVA and HTML tools for Internet programming.
- Scripting languages – Java Script.
- Dynamic HTML programming.
- Server Side Programming tools.

### Syllabus:

#### UNIT-I

Java programming: An overview of Java, Data Types, Variables and Arrays, Operators, Control Statements, Classes, Objects, Methods, Inheritance, Packages, Abstract classes, Interfaces and Inner classes, Exception handling, Introduction to Threads, Multithreading, String handling, Streams and I/O, Applets.

#### UNIT-II

HTML: Introduction to HTML, WWW and WC, Basic HTML Structure, Common HTML Tag, Physical and Logical HTML, Types of Images, client side and server-side Image, mapping, List, Table, Frames, Embedding Audio, Video, HTML form and form elements, Introduction to HTML Front Page.



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### UNIT-III

CSS (Cascading Style Sheets): Introduction to style sheet, Types of style sheet, Style sheet property, Positioning with style sheet.

### UNIT-IV

JAVA Script: Introduction to Java Script, Identifier & operators, control structures, functions Document Object Model (DOM), DOM Objects (window, navigator, history, location), Predefined functions, numbers and string functions, Array in Java scripts, Event handling in Java script.

### UNIT-V

Active Server Pages (ASP)

HTTP basics. Introduction to ASP, Working with personal web server and IIS. Writing simple ASP pages, Request & Response object, Application and session object. ASP and database, Error handling.

### Text Books:

1. Php, Mysql and Apache – Julie c. Meloni, Sams publishing, Fifth Edition, (8 June 2012)
2. Introduction to Internet and HTML scripting – Bhaumik Shroff, Ahmedabad Books India, Third Edition
3. Web Technology and design – C Xavier, New Age International, 2007
4. Beginning HTML and CSS-Rob Larsen, 2013
5. Learning PHP, MySQL, Javascript, CSS and HTML-Robin Nixon, Fourth Edition
6. Java For Dummies-Barry Burd
7. ASP. NET 4.5 IN Simple Steps by Kogent Learning Solutions, 2013

### Reference Books:

1. Internet and Java Programming by R. Krishnamoorthy & S. Prabhu, New Age International Publishers, 1 Jan 2002
2. ASP .Net- The Complete Reference by Matthew Macdonald, 1 July 2017
3. HTML & CSS: The Complete Reference-Thomas A Powell, Mcgraw Hill, Fifth Edition
4. HTML, JavaScript, DHTML and PHP – Ivan Bayross, Fourth Edition
5. Java-The Complete Reference by Herbert Schildt, 1 November 2017
6. HTML & CSS Design and Build Websites -Jon Duckett, 18 November 2011
7. The Essential Guide to CSS and HTML Web Design-Craig Grannell, Apress, Third Edition, 9 March 2008



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							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BCCA603	Compulsory	Software Engineering	3	1	0	4	60	20	20	0	0

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### Course Education Objectives (CEOs):

- To provide knowledge about system development.
- To impart knowledge about software process models.
- To provide detailed knowledge about software design.
- To acquaint students with software quality and testing.

### Course Outcomes (COs): Students will be having:

- An ability to understand system design and its constraints.
- An ability to apply knowledge of software engineering.
- An ability to design a system, a component or process to meet desired needs.
- An ability to identify, formulate and solve engineering Problems
- An ability to measure and to understand quality issues.

### Syllabus:

#### UNIT- I

Introduction: Definition of software and software engineering, Software myths, Software Engineering paradigms: Linear Sequential Model and Prototyping Model. Software Project Management, Software Metrics, Software Cost Estimation, Software Project Planning.

#### UNIT -II

Software Requirement Analysis: Software Risks, Software Configuration Management, System Analysis, Modeling the System Architecture, System Specification, Fundamentals



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of Requirement Analysis, Software Prototyping, Prototyping methods and tools specification  
Software requirements Specifications

### **UNIT -III**

Structured Analysis: Introduction, elements of Analysis model, data objects, attributes and relationships, Cardinality and Modality, ERD, DFD. Classical Analysis Methods: DSSD, JSD, SADT.

### **UNIT- IV**

Software Design: Design principles: Problem partitioning and hierarchy, Abstraction, Modularity, Top-down and Bottom-up strategies. Effective Modular design: functional independency, Cohesion and Coupling.

### **UNIT- V**

Software Testing Methods: Software Testing Fundamentals, White Box Testing, Black Box Testing, Debugging, Software Quality: McCall's Quality Factors.

### **Text Books:**

1. Roger S. Pressman, Software Engineering – A Practioner's Approach, McGraw Hill, 7<sup>th</sup> Edition.
2. Pankaj Jalote, An Integrated Approach to Software Engineering, Third Edition.

### **Reference Books:**

1. Richard Fairley , Software Engineering – Design Reliability and Management.
2. Sommerville, Software Engineering, Pearson Education, 7<sup>th</sup> Edition.
3. Elias M. Awad, "System Analysis & Design", Galgotia publications.



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							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BCCA604	Compulsory	Design and Analysis of Algorithm	3	1	0	4	60	20	20	0	0

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Q/A – Quiz/Assignment/Attendance, MST - Mid Sem Test.

**\*Teacher Assessment** shall be based on following components: Quiz/Assignment/Project/Participation in class  
(Given that no component shall exceed 10 Marks)

### Course Educational Objectives (CEOs):

- To familiarize the students with the need and scope of the subject.
- To develop the analytical skills of students so that they can better understand the problem and devise algorithms efficiently.
- Using simple and well drawn illustrations develop their analytical and programming skills.
- To cover the various data structures and their applications so that aspirants can explore this territory
- to take on the more challenging concepts.

**Course Outcomes (COs):** After the completion of the course the student will be able to

- understand the real world problems and model them
- understand the algorithms and the algorithm design process
- choose a suitable strategy to devise solution of a given problem
- identify, formulate and solve programming problems
- select appropriate data structures for the solution of a given problem
- analyze the algorithms for correctness and in terms of complexity for best, worst and average cases
- function on multi-disciplinary teams
- understand the professional and ethical responsibility

### Syllabus:

#### UNIT-I

Pre-requisites: Data structure and Discrete structures, models of computation, Introduction to Algorithm: Definition, Criteria of Algorithm, Algorithm Analysis, Time and Space complexity, asymptotic notation: Big Oh, Omega and Theta, Best, Average and Worst case analysis.



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### UNIT-II

Design of Algorithm, Types of algorithm strategies, Recurrence relation, Analysis of algorithm, Brute-force approach: Sequential search, Selection sort

Divide and conquer: Structure of divide-and-conquer algorithms: examples; Binary search, Merge sort, Quick sort, Strassen's Multiplication; Analysis of divide and conquer methods

### UNIT-III

Graph searching and Traversal: Overview, Traversal methods (depth first and breadth first search)

Greedy Method: Overview of the greedy paradigm examples of exact optimization solution (minimum cost spanning tree), Approximate solution (Knapsack problem), Single source shortest paths.

### UNIT-IV

Branch and bound: LC searching Bounding, FIFO branch and bound, LC branch and bound application: 0/1 Knapsack problem, Traveling Salesman Problem, searching & sorting algorithms.

Dynamic programming: An Overview, Difference between Dynamic Programming, Divide And Conquer, Applications: Shortest Path in Graph, Matrix Chain Multiplication, Traveling Salesman Problem, Longest Common Sequence.

### UNIT-V

Back tracking: Overview, 8-queen problem and Knapsack problem.

Computational Complexity: Complexity measures, Polynomial Vs non-polynomial time complexity; NP-hard and NP-complete classes, Relation among P, NP, NPC and NPH, Examples.

### Text Books:

1. Ullman, "Analysis and Design of Algorithm", TMH, III Edition
2. Goodman, "Introduction to the Design & Analysis of Algorithms, TMH-2002.
3. Sara Basse, A. V. Gelder, "Computer Algorithms," Addison Wesley, III Edition, 1999
4. T. H. Cormen, Leiserson, Rivest and Stein, "Introduction of Computer algorithm," PHI, II Edition, 2002
5. E. Horowitz, S. Sahni, and S. Rajsekar, "Fundamentals of Computer Algorithms," Galgotia Publication, II Edition, 2008





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							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BCCA615	Elective	Advanced DBMS	4	0	0	4	60	20	20	0	0

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\***Teacher Assessment** shall be based on following components: Quiz/Assignment/Project/Participation in class (Given that no component shall be exceed 10 Marks)

### Course Educational Objectives (CEOs):

- To familiarize the students with the need and scope of the subject.
- to prepare the students so that they can handle the data needed for different organizations
- To develop better understanding of the recent advancements in the field of Database Management System.
- Using simple and well drawn illustrations to develop students skills for data storage and retrieval to support the decision making process.

### Course Outcomes (COs): The student will be able to

- understand the different issues involved in the design and implementation of a database system.
- understand and use the concepts of database designs and database models to solve real world problems
- develop an understanding of essential DBMS concepts such as: database security, integrity, concurrency, distributed database and intelligent database, Client/Server etc.
- apply the concepts of transaction processing for safe and secure transactions in different scenarios
- design and demonstrate the different kind of databases and use backup and recovery provisions

### UNIT-I

Advanced Transaction Processing: Advanced transaction models: Save points, Nested and Multilevel Transactions, Compensating Transactions, Long Duration Transactions, Transaction Work Flows, Transaction Processing Monitors, Shared disk systems.



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### UNIT-II

Objected Oriented and Object Relational Databases: Modeling Complex Data Semantics, Specialization, Generalization, Aggregation and Association, Objects, Object Identity and its implementation, Clustering, Equality and Object Reference, Architecture of Object Oriented and Object Relational databases, Persistent Programming Languages, Cache Coherence.

### UNIT-III

Parallel and Distributed Databases: Parallel architectures, shared nothing/shared disk/shared memory based architectures, Data partitioning, Intra-operator parallelism, pipelining. Distributed Data Storage – Fragmentation and Replication, Location and Fragment Transparency, Distributed Query Processing and Optimization, Distributed Transaction Modeling and concurrency Control, Distributed Deadlock, Commit Protocols, Design of Parallel Databases.

### UNIT-IV

Active Database and Real Time Databases: Issues with Real time databases, Triggers in SQL, Event Constraint and Action: ECA Rules, Query Processing and Concurrency Control, Compensation and Databases Recovery, multi-level recovery.

### UNIT-V

Image and Multimedia Databases: Modeling and Storage of Image and Multimedia Data, Data Structures – R-tree, k-d tree, Quad trees, Content Based Retrieval: Color Histograms, Textures etc., Image Features, Spatial and Topological Relationships, Multimedia Data Formats, Video Data Model, Audio and Handwritten Data, Geographic Information Systems (GIS).

WEB Database: Accessing Databases through WEB, WEB Servers, XML Databases.

### Text Books:

1. Carlos Coronel and Steven Morris, “Database Systems: Design, Implementation, & Management”, Cengage Learning, 13 edition ,January 1, 2018
2. Rob, Coronel “Data Base Systems: Design Implementation & Management”, Cengage Learning, 11<sup>th</sup> edition, February 4, 2014.
3. Raghu Ramakrishnan, “Database Management System” McGraw Hill, 3rd Edition, 16 June 2014
4. Korth, Silbertz, Sudarshan, “Fundamental of Database System”, McGraw Hill Education; Sixth edition (1 December 2013)

### Reference Books:

1. Ramez Elmasri, Shamkant B. Navathe, “**Fundamentals Of Database Systems**” Pearson; 7 edition June 18, 2015.



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BCCA606	Compulsory	Lab - I (Software Development-Minor Project - I JAVA Based)	0	0	4	2	0	0	0	30	20

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### Course Education Objectives (CEOs):

This course covers the implementation of advanced program designs with the tools available in the Java programming language. After a detailed review of the fundamentals, advanced topics will include the Graphical User Interface (GUI) for applications, 2D graphics, multimedia, multithreading and client-server models for networking and database connectivity. If time and interest permits, the class may introduce the Java tools for generics and collections.

### Course Outcomes (COs):

Students will build on their understanding of Object-Oriented Design (OOD) and Programming (OOP) in Java and learn to write robust, Graphical User Interface (GUI) applications and applets. Students will gain a practical familiarity with 2D graphics, multimedia, programming for concurrency, networking and database connectivity. Students may investigate programming for Web Services, if time and interest permits.

### **Text Books:**

1. Patrick Naughton and HerbertzSchildt, “Java-2: The Complete Reference”, TMH, 5<sup>th</sup> edition, 2002.
2. Bill Venner, “Inside Java Virtual Machine”, TMH, 2<sup>nd</sup> edition.
3. Rick Darnell, “HTML 4 unleashed”, Techmedia Publication, 2000
4. Shelley Powers, “Dynamic Web Publishing”, 2<sup>nd</sup> edition, Techmedia, 1998.
5. Paul Dietel and Harvey Deitel, “Java How to Program”, PHI, 8<sup>th</sup> edition, 2010.



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### Reference Books:

1. E. Balagurusamy, “Programming with Java: A Primer”, TMH, 1998.
2. Horstmann, “Computing Concepts with Java 2 Essentials”, John Wiley.
3. Decker and Hirshfield, “Programming Java: A Introduction to Programming Using JAVA”, Vikas Publication, 2000.
4. N.P. Gopalan and J. Akilandeswari, “Web Technology- A Developer’s Perspective”, PHI, 2<sup>nd</sup> edition
5. Eric Jendrock, Jennifer Ball, Debbi Carson, “The Java EE5 Tutorial”, Pearson, 3<sup>rd</sup> edition, 2007.
6. Daniel Liang, “Introduction to Java Programming”, Pearson, 7<sup>th</sup> edition, 2010.



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							THEORY			PRACTICAL	
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BCCA607	Compulsory	Lab-II (Internet Programming Lab)	0	0	4	2	0	0	0	30	20

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**\*Teacher Assessment** shall be based on following components: Quiz/Assignment/Project/Participation in class activities, (Given that no component shall exceed more than 10 marks)

### Course Educational Objective (CEOs):

The goal of this course is to know & understand concepts of internet programming.

**Course Outcomes (Cos):** Students will be able to understand:.

- Java programming concepts
- JAVA and HTML tools for Internet programming.
- Scripting languages – Java Script.
- Dynamic HTML programming.
- Server Side Programming tools.

### List of Experiments:

1. Java classes and objects
2. Inheritance, Polymorphism
3. Interfaces and Exception Handling, Packages
4. Socket Programming in Java
5. RMI
6. Client side scripting using
  - XHTML,
  - JavaScript/DOM
  - CSS
7. XML DTD, Parsers, XSLT
8. Java Applets, AWT, Swings
9. Server Side programming (implement these modules using any of the server side scripting languages like PHP, Servlets, JSP etc.,)
  - Gathering form data



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- Querying the database
- Response generation
- Session management

### **10. Application development**

#### **Text Books:**

1. Cay S. Horstmann and Gary Cornell, “Core Java™, Volume I – Fundamentals” 8th Edition, Prentice Hall, 2007.
2. Cay S. Horstmann and Gary Cornell, “Core Java, Vol. 2: Advanced Features”, 8<sup>th</sup> Edition, Prentice Hall, 2008.
3. Robert W. Sebesta, “Programming the World Wide Web”, Addison-Wesley, 6<sup>th</sup> Edition, 2010.
4. Elliotte Rusty Harold, “Java Network Programming”, Third Edition, O’Reilly, 2004.
5. Uttam K. Roy, “Web Technologies”, Oxford University Press, 1<sup>st</sup> Edition, 2010.
6. Leon Shklar and Rich Rosen, “Web Application Architecture: Principles.