



# Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

## Shri Vaishnav Institute of Computer Applications

### Name of the Program: BCA (Big Data Analytics) offered in Collaboration with IBM

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*
BCABDA 201	Major	Java Programming	2	0	2	3	60	20	20	30	20

**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):

- To familiarize the students with Object Oriented Methodology.
- Students must be able to understand fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, etc.
- Students must have the ability to write a computer program to solve specified problems.
- Students must be able to use the Java SDK environment to create, debug and run simple Java programs.
- Students must learn the concepts of JDBC and concepts of OOPs using Java.

### Course Outcomes (COs):

- Understand different programming paradigms, Evolution of programming languages, Programming styles.
- Differentiate and compare structured and object oriented approach. Also understand OO design and analysis concepts.
- Design efficient solutions for real world problems.
- Explain the concept of class and objects with access control to represent real world entities.

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- Demonstrate the behaviour of programs involving the basic programming constructs like control structures, constructors, string handling and garbage collection.
- Use overloading methodology on methods and constructors to develop application programs.
- Demonstrate the user defined exceptions by exception handling keywords (try, catch, throw, throws and finally).
- Describe the backend connectivity process in java program by using JDBC drivers. 14. Develop Java application to interact with database by using relevant software component (JDBC Driver).

### Syllabus:

#### UNIT – I

**OOPS OVERVIEW:** Introduction to OOPs, Features of OOPs, Advantages of OOPs, Different types of programming approaches.

**INTRODUCTION TO JAVA:** What is java, History of java, Java features, Introduction to Eclipse IDE, Explanation about java compiler, JVM, JRE, JDK, Bytecode, How to run Eclipse ide.

**JAVA COMPONENTS :** Constant, variable, token, literal, Identifiers, datatypes, keywords, All types of operators, Command line arguments, Taking user input

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### UNIT - II

**CONTROL STRUCTURE:** Conditional statements-if, if else, nested if, ladder else if, Unconditional statements- switch case, Looping statements.

**CLASS AND OBJECT:** What is class and object, Data members and methods, Inner classes and types.

**CONSTRUCTORS:** What is constructor, Advantages, Types with examples.

### UNIT – III

**ARRAY:** What is array, Array declaration with syntax, Types-1d, 2d and 3d with examples each.

**STRING HANDLING:** String introduction, String class with methods with examples, String Builder class with methods and examples, StringBuffer class with examples.

**INHERITANCE:** Introduction, Types with examples, Interface with example, Use of super, Use of abstract with example.

### UNIT – IV

**POLYMORPHISM:** What is polymorphism, Types of polymorphism.

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**EXCEPTION HANDLING:** What is exception, Types, Predefined exceptions, User-defined exceptions.

**MULTI-THREADING:** Introduction, Advantages. Multi-threading concept, Lifecycle of Thread, Thread priority, Thread interface, Thread synchronization.

### UNIT – V

**PACKAGE:** What is package, Benefits of using package, Types, Predefined package, User-defined package.

**FILE HANDLING:** Java I/O, Pre-defined file i/o methods, Stream and types, File classes, File operations with examples.

**JDBC:** Introduction to java database, what is JDBC, JDBC Connectivity.

### Reference Books:

1. E. Balagurusamy, “Programming with Java: A Primer”, TMH.
2. Patrick Naughton and Herbert Schildt, “Java-2: The Complete Reference”, TMH.
3. Horstmann, “Computing Concepts with Java 2 Essentials”, John Wiley.
4. Daniel Liang, “Introduction to Java Programming”, Pearson.
5. Decker and Hirshfield, “Programming Java: A Introduction to Programming Using JAVA”, Vikas Publication.

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6. N.P. Gopalan and J. Akilandeswari, “Web Technology- A Developer’s Perspective”, PHI.

#### List of Experiments:

1. Write a Java program that prompts the user for an integer and then prints out all prime numbers up to that Integer.
2. Write a Java program for sorting a given list of names in ascending order.
3. Write a Java program that checks whether a given string is a palindrome or not.

Ex: MADAM is a palindrome.

4. Write a Java Program that reads a line of integers, and then displays each integer, and the sum of all the integers (use String Tokenizer class).
5. Write a Java program that displays the number of characters, lines and words in a text file.
6. Write a Java program that reads a file and displays the file on the screen, with a line number before each line.
7. Write a Java program that illustrates how run time polymorphism is achieved.
8. Write a Java program for creating multiple threads a) Using Thread class. b) Using Runnable interface.
9. Write a java program that illustrates the following a) Handling predefined exceptions. b) Handling user defined exceptions.

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### COURSE OBJECTIVES

The student will have ability to:

1. This course makes student learn the fundamental principles and practices associated with each of the agile development methods.
2. To apply the principles and practices of agile software development on a project of interest and relevance to the student.
3. To understand the key Concepts of Agile Development, Agile Project Delivery and Agile Project Management.
4. To understand the difference between Agile and Traditional Project Delivery.
5. To Understand Key Methodologies including scrum and Kanban.

### COURSE OUTCOMES

Upon completion of the subject, students will be able to:

1. Analyzing the philosophy and principles of Agile.
2. Understanding the life cycle of a project, including alternative configurations and other project management models.
3. Analyzing the roles and responsibilities within agile projects.
4. Understanding how the Agile Project Management process can enable planning, management and control for predictable agile project deliveries.

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5. Implementing the software projects in a continuous and faster way.

6. Executing the various tools used in DevOps and applying them in project development.

## SYLLABUS

### UNIT-I

**DevOps Fundamentals, Git, Maven, Docker:** - What is a Project: Project Definition, Project vs Operations, Project, Program and Portfolio Relationship, Project Features, Project Phases, Project Execution Methodologies: Waterfall Model, V-Model, Agile, Agile vs Waterfall. Agile Deep Dive: Agile Methodology Overview, Agile Manifesto Introduction and Guiding Principles, Agile Team Roles, Agile Frameworks. DevOps Fundamentals: Introduction to DevOps, Introduction to Continuous Integration/Continuous Delivery/Continuous Deployment, DevOps Tools-Git, Maven, Docker: Git, Maven, Docker.

### UNIT-II

**Scrum framework, Scrum Artifacts:** -Scrum: Scrum Foundation, Scrum Team, Roles of Scrum Team, Sprints. Scrum Artifacts: Product Backlog, Sprint Backlog, Sprint Burndown chart, Impediment List, Product Increment.

### UNIT-III

Sprint Planning, Scrum Meetings, PBR, Sprint Goal, User Stories, Definition of Done, Team Velocity, Defect Density, Scrum Scaling, Scrum Practices, Scrum Vs Kanban, Xtreme Programming, Xtreme Programming vs Scrum: -Scrum Ceremonies: Sprint Planning,

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Daily Scrum Meeting, PBR, Sprint Review. Scrum Sprint Planning: Sprint Goal, User Stories, Estimate User Stories, Definition of Done. Scrum Metrics: Sprint Goal Success, Team Velocity, Sprint Burn Down Charts, Defect Density, Scrum Scaling, Distributed Scrum Practices, Agile Environments and tools, Scrum vs Kanban, Xtreme Programming vs Scrum.

### UNIT-IV

**Puppet, Jenkins, Junit, Nagios, Introduction of a Use case for CI/CD Pipeline, Problem Solving with DevOps:** -More on DevOps Tools: Puppet, Jenkins, Junit, Nagios. DevOps Use-case: Introduction of a Use-case for CI/CD Pipeline, Problem Solving with DevOps.

### UNIT-V

**Advanced DevOps Concepts, Automatic Rollback, Automatic Provisioning, what is Cloud, IBM Cloud, DevOps using IBM Cloud:** -Advanced DevOps Concepts: Automatic Rollback, Automatic Provisioning. Introduction to DevOps on IBM Cloud: What is Cloud, IBM Cloud, DevOps Using IBM Cloud.

### TEXTBOOKS:

1. Eric Ries, The Lean Startup, Publisher: Current, 1st edition, September 13, 2011
2. Roman Pichler, Agile Product Management with Scrum, Publisher: Addison Wesley, 1st edition, 22 March 2010
3. Robert C. Martin, Clean Code: A Handbook of Agile Software Craftsmanship. Publisher : PHI; First edition , 25 September 2017
4. Anju Singhal, Jai Singhal, Book: Scrum Guide, Publisher: Agiliants Inc, First edition, 13 August 2013
5. Robert C. Martin, Agile Software Development, Principles, Patterns and Practices, Publisher: PHI; Subsequent edition 15 October 2002

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BCABDA 203	Major	Agile Development Methodologies (DevOps + Agile)	2	0	2	3	60	20	20	30	20

### REFERENCES:

1. IBM Softcopy(ppt,pdf,docx)
2. <http://www.katacoda.com>
3. <https://www.edureka.co/blog/docker-commands/mirantis.com/tag/docker>
4. <https://www.scalyr.com/blog/create-docker-image/>
5. <https://www.howtoforge.com/tutorial/how-to-create-docker-images-with-dockerfile/>

### LIST OF EXPERIMENTS:

1. Installation of GIT and Creating GIT Repository.
2. By which method we can supply a commit message to a commit? Describe in brief.
3. Write the way to check state of local git repository since last commit.
4. Give the command to initialize a new Git repository.
5. Write the command that removes the target directory with all the build data before starting the build process.
6. Create a As-is scenario Map taking any example you like.
7. Creating a Maven Project.
8. Installation and setting up puppet.
9. Installing Docker and Creating Docker Image.
10. Process all docker commands.
11. Setting up DevOps on IBM Cloud.

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12. For Designing a better way for cab booking from start to finish. Create a List of Stakeholders, Empathy Map and As-is Scenario Map
13. Create a 2-3 Sprint with entire team.
14. Create a To-be Scenario for any organization.
15. Discuss the empathy Map in design thinking.

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MABCA202	Minor	Fundamentals of Probability and Statistics	3	0	0	3	60	20	20	0	0

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### Course Educational Objectives (CEOs):

To introduce the students with the concepts of Probability and Distributions.

### Course Outcomes (Cos):

After the successful completion of this course students will be able to:

1. *understand and apply the fundamentals of probability.*
2. *justify and use of different probability distributions for given data.*
3. *classify and apply the test of hypothesis.*
4. *elaborate sample distribution and statistical interference.*

### UNIT – I

Probability: Axioms, Conditional probability, Baye's theorem, Random Variables, Discrete random variables – Binomial, Geometric, Poisson RV.

### UNIT – II

Continuous RV – Uniform, Exponential, Gamma & Normal,

### UNIT – III

Expectation, Mean and Variance, jointly distributed RVs, Co-variance, Sums of RVs, Central Limit theorem, Moment Generating functions.

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							SEM Univer sity	Term Exams	Assessm ent	SEM Univer sity	Term Exams
MABCA202	Minor	Fundamentals of Probability and Statistics	3	0	0	3	60	20	20	0	0

## **UNIT – IV**

Sample Distribution, Inference concerning mean, Statistical Inference – Parameter estimation, Maximum likely-hood estimation.

## **UNIT – V**

Testing of Hypothesis, Curve Fitting-Method of the Least Square, Curvilinear multiple regression

### **Text and Reference Books:**

1. Ross, S: A First course in probability, sixth edition, Pearson Education.
2. Ross Sheldon: Introduction to Probability models, Eighth edition, Elsevier, 2003
3. Trivedi K. S.: Probability & Statistics with Reliability, Queuing and Computer Science Applications, Second edition, Wiley, 2002

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BCABDA202	Minor	Data Structure	2	0	2	3	60	20	20	30	20

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### Course Educational Objectives(CEOs):

- To understand the students with the applications of Standard data structure in real world problems.
- To provide knowledge of creation of new data structures.
- To familiarize the students with the analysis and design a particular problem.

### Course Outcomes (Cos):students will be able to

- Demonstrate familiarity with major algorithms and data structures.
- Analyze performance of algorithms.
- Choose the appropriate data structure and algorithm design method for a specified application.
- Demonstrate understanding of the abstract properties of various data structures such as stacks, queues, lists, trees and graphs
- Demonstrate understanding of various sorting algorithms, including bubble sort, insertion sort, selection sort, heap sort and quick sort.
- Understand and apply fundamental algorithmic problems including Tree traversals, Graph traversals, and shortest paths.
- Demonstrate understanding of various searching algorithms.
- Program multiple file programs in a manner that allows for reusability of code.
- Compare different implementations of data structures and to recognize the advantages and disadvantages of the different implementations.
- Write complex applications using structured programming methods.

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BCABDA202	Minor	Data Structure	2	0	2	3	60	20	20	30	20

### UNIT - I

The Concept of Data Structure, Abstract Data Type, Concept of List and Array, Introduction to Stack, Stack as an Abstract Data Type, Primitive Operations on Stack, Stack's Applications - polish notations Infix, Postfix, Prefix and Recursion. Introduction to Queues, Primitive operations on Queues, Queue as an Abstract Data Type, Circular Queue, Dequeue, Priority Queue, Applications of Queue.

### UNIT - II

**Linked List** - Introduction to Linked List, Memory Representations of Linked List, comparison; Operations on Linked List, Linked Representation of Stack and Queue, Header Nodes. Types of Linked List : Doubly Linked List, Circular Linked List, Application of Linked List, Self Referential Structures.

### UNIT –III

**Trees:** Definition, Basic Terminology of Trees, Tree Representations as Array and Linked. Binary Trees, Binary Tree Operations. Traversal of Binary Trees – In order, Preorder& Post order, Complete Binary Tree, almost complete binary tree; Application of Binary Tree.

### UNIT-IV

**Complexity:** concept and notations. Searching: Sequential, Binary and their comparison. Sorting - External and Internal Sorting, Insertion Sort, Selection Sort, Quick Sort, Bubble Sort, Heap Sort, Comparison of Sorting Methods. Hashing;

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# Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

## Shri Vaishnav Institute of Computer Applications

**Name of the Program: BCA (Big Data Analytics) offered in Collaboration with IBM**

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*
BCABDA202	Minor	Data Structure	2	0	2	3	60	20	20	30	20

### UNIT-V

**Graphs** - Introduction to Graphs, Basic Terminology, Directed, Undirected and Weighted graph, Representation of Graphs, Graph Traversals - Depth First and Breadth First Search. Applications of Graphs.

#### Text Books:

1. Kruse R.L. Data Structures and Program Design in C; PHI
2. Aho, "Data Structure & Algorithms".
3. Trembly and *SORRENSON*, "Introduction to Data Structure with Applications".
4. Tennenbaum A.M. & others, "Data Structures using C & C++"; PHI
5. Horowitz & Sawhney, "Fundamentals of Data Structures", Galgotia Publishers.
6. Yashwant Kanetkar, "Understanding Pointers in C", BPB.
7. Lpschuists, "Data Structure", (Schaum 's Outline Series, McGraw Hill publication)
8. Ellis Horowitz and Sartaj Sawhney, "Fundamentals of Computer Algorithm"

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BCABDA202	Minor	Data Structure	2	0	2	3	60	20	20	30	20

### List of Programs:

1. Write a program to create a two dimensional array and perform add, subtract and multiplication operations.
2. Write a program to create a two dimensional array using dynamic memory allocation.
3. Write a program to implement stack.
4. Write a program to convert infix expression into postfix expression.
5. Write a program to check balanced parentheses for a given infix expression.
6. Write a program to evaluate postfix expression.
7. Write a program to implement queue.
8. Write a program to implement circular queue.
9. Write a program to implement link list with insert, delete, search, view, and delete function.
10. Write a program to implement ordered link list.
11. Write a program to add two polynomials.
12. Write a program to create doubly link list.
13. Write a program to implement tree with insert, delete and search function.
14. Write a program for in order, post order and preorder traversal of tree.
15. Write a program for binary search and sequential search using recursion.
16. Write a program for bubble sort and sequential search.
17. Write a program for insertion sort and quick sort.

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**Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore**  
**Shri Vaishnav School of Management**

**Choice Based Credit System (CBCS) in Light of NEP-2020**  
**BBA+MBA - II SEMESTER (2022-2026)**

**ML307 ENVIRONMENTAL MANAGEMENT AND SUSTAINABILITY**

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*	L	T	P	CREDITS
ML307	AECC	Environmental Management and Sustainability	60	20	20	0	0	4	0	0	4

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P - Practical; C - Credit; AECC - Ability Enhancement Compulsory Course

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

**Course Objective**

- To create awareness towards various environmental problems.
- To create awareness among students towards issues of sustainable development.
- To expose students towards environment friendly practices of organizations.
- To sensitize students to act responsibly towards environment.

**Examination Scheme**

The internal assessment of the students' performance will be done out of 40 Marks. The semester Examination will be worth 60 Marks. The question paper and semester exams will consist of two sections A and B. Section A will carry 36 Marks and consist of five questions, out of which student will be required to attempt any three questions. Section B will comprise of one or more cases / problems worth 24 marks.

**Course Outcomes**

- The course will give students an overview of various environmental concerns and practical challenges in environmental management and sustainability.
- Emphasis is given to make students practice environment friendly behavior in day-to-day activities.

**COURSE CONTENT**

**UNIT I: Introduction to Environment Pollution and Control**

- Pollution and its types (Air, Water, and Soil): Causes, Effects and Control measures
- Municipal Solid Waste: Definition, Composition, Effects
- Electronic Waste: Definition, Composition, Effects
- Plastic Pollution: Causes, Effects and Control Measures

  
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20

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## Shri Vaishnav Institute of Computer Applications

**Name of the Program: BCA (Big Data Analytics) offered in Collaboration with IBM**



### Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore Shri Vaishnav School of Management

#### Choice Based Credit System (CBCS) in Light of NEP-2020 BBA+MBA - II SEMESTER (2022-2026)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						
			THEORY			PRACTICAL			CREDITS
			END SEM University Exam	Two Term Exam	Teacher Assessment*	END SEM University Exam	Teacher Assessment*	L T P	
ML367	AECC	Environmental Management and Sustainability	60	20	20	0	0	4 0 0	4

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#### UNIT II: Climate Change and Environmental Challenges


1. Global Warming and Green House Effect
2. Depletion of the Ozone Layer
3. Acid Rain
4. Nuclear Hazards

#### UNIT III: Environmental Management and Sustainable Development


1. Environmental Management and Sustainable Development: An overview
2. Sustainable Development Goals (17 SDGs)
3. Significance of Sustainable Development
4. Environment Friendly Practices At Workplace and Home (Three Rs' of Waste Management, Water Conservation, Energy Conservation)

#### UNIT IV: Environmental Acts

1. The Water (Prevention and Control of Pollution) Act, 1974: Objectives, Definition of Pollution under this act, Powers and Functions of Boards
2. The Air (Prevention and Control of Pollution) Act, 1981: Objectives, Definition of Pollution under this act, Powers and Functions of Boards
3. The Environment (Protection) Act, 1986: Objectives, Definition of important terms used in this Act, Details about the act.
4. Environmental Impact Assessment: Concept and Benefits

  
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Choice Based Credit System (CBCS) in Light of NEP-2020 BBA+MBA - II SEMESTER (2022-2026)											
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**Legends:** L - Lecture; T - Tutorial/Teacher Guided Student Activity; P - Practical; C - Credit; AECC- Ability Enhancement Compulsory Course.

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

**UNIT V: Role of Individuals, Corporate and Society**

1. Environmental Values
2. Positive and Adverse Impact of Technological Developments on Society and Environment
3. Role of an individual/ Corporate/ Society in environmental conservation
4. Case Studies: The Bhopal Gas Tragedy, New Delhi's Air Pollution, Arsenic Pollution in Ground Water (West Bengal), Narmada Valley Project, Cauvery Water Dispute, Fukushima Daiichi Disaster (Japan), Ozone Hole over Antarctica, Ganga Pollution, Deterioration of Taj Mahal, Uttarakhand flash floods

**Suggested Readings:**

1. Rogers, P.P., Jalal, K.F., Boyd, J.A. (Latest Edition). *An Introduction to Sustainable Development*. Earthscan
2. Kalam, A.P.J. (Latest Edition). *Target 3 Billion: Innovative Solutions Towards Sustainable Development*. Penguin Books
3. Kaushik, A. and Kaushik (Latest Edition). *Perspectives in Environmental Studies*. New Delhi: New Age International Publishers.
4. Dhameja, S.K. (Latest Edition). *Environmental Studies*. S.K. Kataria and Sons. New Delhi
5. Bharucha, E. (Latest Edition). *Environmental Studies for Undergraduate Courses*. New Delhi: University Grants Commission.
6. Wright, R. T. (Latest Edition). *Environmental Science: towards a sustainable future*. New Delhi: PHL Learning Private Ltd.
7. Rajagopalan, R. (Latest Edition). *Environmental Studies*. New York: Oxford University Press.

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