Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Computer Applications

Name of the Program: BSC (Data Science) / BCA (BDA- 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*
BSCDS202	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, StringBuilder 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.

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.

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

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

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P - Practical; C - Credit.
*Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

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, Sprit 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, 1 st 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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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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Subject Code	Category	Subject Name	Teaching & Evaluation Scheme								
			Theory			Practical		L	T	P	CREDITS
			End Sem University Exam	Two Term Exam	Teacher Assessment	End Sem University Exam	Teacher Assessment				
BCCA202N	BS	Mathematical Foundation of Computer Science II	60	20	20	0	0	3	1	-	4

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Q/A – Quiz/Assignment/Attendance, MST - Mid Sem Test.
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Course Educational Objectives (CEOs):
To introduce the students with the numerical techniques for computer science.

Course Outcomes (COs):
After the successful completion of this course students will be able to:

1. *construct the numerical solution of the algebraic and transcendental equations.*
2. *demonstrate the techniques of the finite difference calculus.*
3. *apply the techniques of Interpolation.*
4. *discuss the numerical solution of the system of linear algebraic equations.*

UNIT – I

Root finding: Newton's Methods, Fixed point iteration, ill-behaved root finding problems.

UNIT – II

Calculus of finite differences:

Operators, forward difference operator, backward difference operator, E-operator, relation between them, difference of a polynomial, factorial polynomial, Inverse operator. forward difference table, Backward difference Table.

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UNIT – III

Interpolation

Introduction to Interpolation; Interpolation with equally spaced interval, forward and backward interpolation formula, Interpolation with unequally spaced intervals, Newton divided difference interpolation, Langrage's formula for interpolation and inverse interpolation.

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BCCA202N	BS	Mathematical Foundation of Computer Science II	60	20	20	0	0	3	1	-	4

UNIT – IV

Numerical differentiation and integration- Calculation of Derivative of first order by forward and backward interpolation formula. Trapezoidal and Simpson's Rules, one-third rule, three-eight rule, Weddle's rule.

UNIT – V

Solution of system of linear algebraic equations: Gaussian elimination with pivoting, Jacobian and Gauss-Siedel iteration.

References

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1. Akai Terrence J: Applied Numerical Methods for engineers, John Wiley & Sons, Inc. 1994
2. Schilling Robert J & Harried Sanddra L: Applied Numerical Methods for engineers, Thomson, 2000.
3. S. D. Conte and C. de Boor, Elementary Numerical Analysis - An Algorithmic Approach, McGraw Hill,2005.
4. B. S. Grewal, Higher Engineering Mathematics, Khanna Publishers, Delhi.
5. Erwin Kreyszig, Advanced Engineering Mathematics, 10th Ed, John Wiley Publisher.

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BSCDS201	Minor	Data Structures	2	0	2	3	60	20	20	30	20

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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):

- Allow to assess how the choice of data structures and algorithm design methods impacts the performance of programs.
- To choose the appropriate data structure and algorithm design method for a specified application.
- To solve problems using data structures such as linear lists, stacks, queues, binary trees, binary search trees, and graphs and writing programs for these solutions.
- To efficiently implement the different data structures and solutions for specific problems.

Course Outcomes (Cos): students will be able to

- Analyze the concepts of algorithm evaluation and find time and space complexities for searching and sorting algorithms.
- Implement linear data structure such as stacks, queues, linked lists and their applications.
- Implement basic operations on binary trees.
- Demonstrate the representation and traversal techniques of graphs and their applications on data.

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UNIT - I

Introduction, searching and sorting: Algorithm specification: Introduction, Recursive algorithms, Data Abstraction, Performance Analysis: Space complexity, time complexity, asymptotic notation, Searching: Linear and Binary search algorithms, Sorting: Bubble sort, Selection sort, Insertion sort, quick sort, merge sort.

UNIT - II

Stacks and Queues: Stacks, stacks using dynamic arrays, queues, circular queues usingdynamicarrays, Evaluation of an expression: Expressions, evaluating postfix expression, conversion of infix expression to postfix expression.

UNIT –III

Linked Lists: Single linked lists, Representing chains, operations for chains, operations for circularly linked lists, doubly linked lists, Polynomials: Representation, adding polynomials, sparse matrix representation, linked stacks and queues.

UNIT-IV

Trees: Introduction: Terminology, representation of trees, binary trees: abstract data type, Properties of binary trees, binary tree representation, binary tree traversals: Inorder, preorder, postorder, Binary search trees: Definition, searching BST, insert into BST, delete from a BST, Height of a BST.

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BSCDS201	Minor	Data Structures	2	0	2	3	60	20	20	30	20

UNIT-V

The Graph ADT: Introduction, definition, graph representation, elementary graph operations: BFS, DFS, Spanning trees, minimum cost spanning tree: Prim's, Kruskal's algorithms.

Text Books:

1. Fundamental of Data Structures in C – 2ndEdition, Horowitz, Sahani, AndersonFreed, University Press
2. TremblyandSORRENSON,"Introduction to Data Structure with Applications".
3. TennenBaum A.M.,"Data Structures using C & C++"; PHI
4. YashwantKanetkar, "Understanding Pointers in C", BPB.

Reference Books:

1. Data Structures and Algorithm Analysis in C – 2nd Edition, Mark Allen Weiss, Pearson
2. Classic Data Structures – 2nd Edition, Debasis Samantha, PHI

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BSCDS201	Minor	Data Structures	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, anddelete 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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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					
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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

1. To create awareness towards various environmental problems.
2. To create awareness among students towards issues of sustainable development.
3. To expose students towards environment friendly practices of organizations.
4. 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 exam 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

1. The course will give students an overview of various environmental concerns and practical challenges in environmental management and sustainability.
2. 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

1. Pollution and its types (Air, Water, and Soil): Causes, Effects and Control measures
2. Municipal Solid Waste: Definition, Composition, Effects
3. Electronic Waste: Definition, Composition, Effects
4. Plastic Pollution: Causes, Effects and Control Measures

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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.

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 House (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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