



Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Institute of Computer Applications

Name of the Program: BCA in Big Data Analytics in association 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*
BCABDA101N	Major	C/C++ programming	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:

- To understand the concept of templates and their usage in C++.
- To understand the memory model in C++ and the stack vs. heap allocation.
- To explore advanced data structures such as linked lists, trees, and graphs.
- To understand file handling concepts and techniques in C++.
- To explore advanced features such as lambda expressions, move semantics, and constexpr.

Course Outcomes: Students will be able to

- Implement memory model in C++ and the stack vs. heap allocation.
- Demonstrate advanced data structures such as linked lists, trees, and graphs.
- Apply file handling concepts and techniques in C++.

UNIT- I: Introduction to Advanced C++ Concepts and OOP Duration: 10 Hrs.

An introduction to advanced concepts in C++ programming language and delves deeper into object-oriented programming (OOP) concepts using C++.

Advanced topics such as function pointers and virtual functions, Gain knowledge about exception handling and error handling mechanisms in C++, principles of OOP and its implementation in C++, advanced OOP concepts such as inheritance, polymorphism, and encapsulation, advanced techniques for designing and implementing classes and objects.

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BCABDA101N	Major	C/C++ programming	2	0	2	3	60	20	20	30	20

UNIT- II: Memory Management in C++

Duration: 6 Hrs.

Memory management in C++ and techniques to optimize memory usage and prevent memory leaks.

Memory model in C++ and the stack vs. heap allocation, dynamic memory allocation and deallocation using new and delete operators, techniques for managing memory efficiently, including smart pointers and RAII (Resource Acquisition Is Initialization).

UNIT- III: Advanced Data Structures and Algorithms

Duration: 6 Hrs.

Advanced data structures and algorithms commonly used in software development, with a focus on their implementation in C++.

Advanced data structures such as linked lists, trees, and graphs, basics of algorithm design and analysis, Implement and analyze common algorithms using C++, including sorting and searching algorithms.

UNIT- IV: File I/O and Exception Handling

Duration: 4 Hrs.

File input/output operations and exception handling in C++.

File handling concepts and techniques in C++, read from and write to files using streams, Exception handling mechanisms to handle errors and exceptions in C++ programs.

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UNIT- V: Advanced Topics in C++

Duration: 6 Hrs.

Advanced features such as lambda expressions, move semantics, and constexpr, Understand the basics of multithreading and concurrency in C++, Learn about C++ standard libraries and their usage for advanced programming tasks.

Text Books:

1. Robert Lafore, “Object-Oriented Programming in C++”, 4e, SAMS.
2. Ricahrd C. Lee, Wiiliam M. Tepfenhart “UML & C++: A Practical Guide To Object Oriented Development”, 2e, Pearson.
3. Herbert Schildt, “C++ the complete reference”, 4e, 2003.
4. E Balagurusamy, “Object Oriented Programming with C++”, 6e, McGraw Hill Education.
5. G.Booch, “Object Oriented Analysis And Design With Applications”, 3e, Pearson.
6. K.R. Venugopal, RajkumarBuyya, “Mastering C++”, 2e, McGraw Hill Education.

Note: The practicals will be conducted by the IBM trainers.

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BCABDA103N	Major	Software Engineering Fundamentals	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 Education Objectives (CEOs):

- To provide knowledge about system development.
- To impart knowledge about software process models.
- To provide detailed knowledge about software development.
- To acquaint students with programming part.
- To provide study Software Architecture, Design, and Patterns.
- To provide the students Job Opportunities and Skillsets

Course Outcomes (COs): Students will be having:

- An ability to understand system development.
- An ability to apply knowledge of software process models.
- An ability to develop software.
- An ability to apply programming on software development problems
- An ability to understand Software Architecture, Design, and Patterns.
- An ability to acquire Job Opportunities and Skillsets.

UNIT I: What is Software Engineering?

Introduction to the SDLC, Phases of the SDLC, Activity: Phases in the SDLC, Building Quality Software, Requirements, Software Development Methodologies Software Versions, Software Testing, Software Documentation, Roles in Software Engineering Projects, Insiders' Viewpoint: Job Roles in Software Engineering Teams, The Software Building Process and Associated Roles.

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BCABDA103N	Major	Software Engineering Fundamentals	2	0	2	3	60	20	20	30	20

UNIT 2: Introduction to Software Development

Overview of Web and Cloud Development, Learning Front-End Development, The Importance of Back-End Development, Teamwork and Squads, Insiders' Viewpoint: Teamwork in Software Engineering, Pair Programming, Insiders' Viewpoint: Pair Programming, Activity: Categorizing Front- and Back-End Technologies, Introduction to Development, Application Development Tools, More Application Development Tools, Software Stacks, Hands-on Lab: Getting Started With an IDE, Insiders' Viewpoint: Tools and Technologies, Tools in Software Development.

UNIT 3: Introduction to Programming

Comparing Compiled and Interpreted Languages Query and Assembly Languages, understanding Code Organization Methods, Insiders' Viewpoint: Types of Languages, Activity: Programming Logic and Organizational Methods, Programming Languages and Organization, Branching and Looping Programming Logic, Introduction to Programming, Hands-on Lab: Programming Fundamentals with Python, Introduction to Programming Concepts

UNIT 4: Software Architecture, Design, and Patterns

Introduction to Software Architecture, Software Design and Modeling, Object-Oriented Analysis and Design, Insiders' Viewpoint: Importance of Design and Software Architecture, Activity: Create an Architectural Diagram, Software Architecture and Design, Approaches to Application Architecture, Architectural Patterns in Software, Application Deployment Environments, Production Deployment Components, Insiders' Viewpoint: Deployment Architecture, Software Architecture Patterns and Deployment Topologies.

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BCABDA103N	Major	Software Engineering Fundamentals	2	0	2	3	60	20	20	30	20

UNIT 5

Job Opportunities and Skillsets

What Does a Software Engineer Do?, A Day in the Life of a Software Engineer, Skills Required for Software Engineering, Insiders' Viewpoint: Advice to Future Software Engineers, Insiders' Viewpoint: Women in Software Engineering, Job Outlook for Software Engineers, Career Paths in Software Engineering, Software Engineering Job Titles, Insiders' Viewpoint: Career Paths, Activity: Matching Roles with Responsibilities, Code of Ethics.

Text Book

1. R. S. Pressman, "Software Engineering – A practitioner's approach", 6th ed., McGraw Hill Int.
2. Pankaj Jalote "Software Engineering", Kindle Edition, Wiley Publications.
3. Ian Sommerville : Software Engineering 6th Edition (Addison-Wesley).
4. Richard Fairley : Software Engineering Concepts (TMH).
5. Elis Awad, "System Analysis & Design", Galgotia publications.
6. W.S. Jawadekar: Management Information Systems, TMH Publication, India.

List of Experiments:

1. Problem Statement and Feasibility Study
2. Preparation of Software Requirement Specification (SRS)
3. Use Case Diagram for the proposed system

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4. Functional and Non-functional Requirements & RTM

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BCABDA103N	Major	Software Engineering Fundamentals	2	0	2	3	60	20	20	30	20

5. Data Flow Diagrams (DFD) – Level 0, Level 1, Level 2

6. Entity Relationship Diagram (ERD)

7. UML Class Diagram

8. UML Sequence Diagram

9. UML Activity Diagram

10. User Interface (UI) Design / Prototype

11. Coding Standards Demonstration

12. Module Implementation (Sample Code)

13. Test Case Design – Black Box & White Box

14. Unit Testing and Integration Testing

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Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Program Name: BCA/BCA+MCA

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			End Sem University Exam	Two Term Exam	Teachers Assessment*	End Sem University Exam	Teachers Assessment*				
BCCA 102N	BS	Mathematical Foundation of Computer Science I	60	20	20	0	0	3	1	0	4

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 Educational Objectives (CEOs):

To introduce the students to the basics of set theory, calculus, and linear algebra.

Course Outcomes (COs):

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


1. Understand the concepts of set theory.
2. Learn the basics of differential and integral calculus.
3. Apply the fundamentals of Calculus.
4. Learn the basics of Linear algebra.

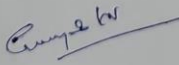
UNIT - I

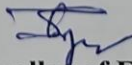
Set Theory: Sets and their representations, Empty set, Finite and Infinite sets, Equal sets, Subsets, Subsets of a set of real numbers especially intervals (with notations), Power set, Universal set, Venn diagrams, Union and Intersection of sets, Difference of sets, Complement of a set, Applications of sets.


UNIT - II

Function: Real Valued function, Classification of real valued functions, Pictorial representation of a function, domain, co-domain and range of a function, Real valued functions, domain and range of these functions: Constant, Identity, Polynomial, Rational, Modulus, Signum, Exponential, Logarithmic, Greatest integer functions (with their graphs) Sum, difference, product


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and quotients of functions.

UNIT – III: Calculus

Differentiation: Introductions, Derivative of a function, Derivative of a constant, Derivative of a product of a constant and a function, Derivative of the sum or difference of two functions, Derivative of the product of two functions (product formula), Derivative of the quotient of two functions (Quotient formula) – Without Proof, Derivative of x^n w.r.t. x , where n is any rational number, Derivative of e^x , Derivative of $\log_e x$, Derivative of a^x , Derivative of trigonometric functions from first principles (Without Proof). Applications.

UNIT – IV

Integration: Introduction, Definition, Standard formulae, Rules of integration, Method of substitution, Integration by parts, definite integrals. Applications.

UNIT – V

Matrices and Determinant: Introduction matrices, Types of matrices, Operation on matrices, Transpose of a matrix, Matrix Multiplication, Determinants, Properties of determinants, Product of determinants, Minors and co-factors, Adjoint of square matrix, Singular and non-singular matrices, Inverse of a matrix, Solution of system of linear of equations using matrix method, Cramer's rule.

Reference books:

1. .Paria G., Differential Calculus, Scholar's Publications, Indore.
2. Paria G., Integral Calculus, Scholar's Publications, Indore.
3. Dr. B. S. Grewal, Higher Engineering Mathematics.
4. Differential Calculus by Shanthi Narayan.
5. Integral Calculus by Shanthi Narayan.

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BCABDA102	Minor	Computers Fundamentals	3	0	0	3	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 be exceed 10 Marks)

Course Educational Objectives (CEOs):

- To create basic understanding of Computer System
- To provide knowledge of concepts of Operating Systems
- To familiarize the students with the need, goal, function and architecture of various operating system available
- To develop the understanding of trends of IT industry, safe and ethical use of IT

Course Outcomes (COs): students will be able to

- To understand the need, goal and function of the OS
- Understand and use Windows and Linux operating systems commands.
- Organizing and manipulating files and folders.
- Understand and Use different editors of Linux
- Manipulating data using input output redirection
- Writing shell scripts
- To exercise the safe computer practices

Unit-I

Introduction to Computer Fundamentals: Introduction to Computer, Computer System Hardware, Computer Memory, Input and Output Devices, Interaction between User and Computer, Introduction to Free and Open Source Software, Definition of Computer Virus, Types of Viruses, Use of Antivirus software.

Unit-II

Computer: Definition, Classification, Organization i.e. CPU, register, Bus architecture, Instruction set, Memory & Storage Systems, I/O Devices, and System & Application Software.

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BCABDA102	Minor	Computers Fundamentals	3	0	0	3	60	20	20	0	0

Computer Application in e-Business, Bio-Informatics, health Care, Remote Sensing & GIS, Meteorology and Climatology, Computer Gaming, Multimedia and Animation etc.

Unit–III

Basics of Operating System, Definition of Operating System, Objectives, types, and functions of Operating Systems. Working with Windows Operating System: Introduction, The Desktop, Structure of Windows, Windows Explorer, File and Folder Operations, The Search, The Recycle Bin, Configuring the Screen, Adding or Removing New Programs using Control Panel, Applications in windows (Paint, Notepad, WordPad, Calculator).

Unit–IV

Introduction of Basic Commands of LINUX and Editors, Managing Files and Directories in LINUX, Programming Environment in LINUX, Writing and executing programs in LINUX.

Unit–V

Compilers & Interpreters: aspects of compilation, memory allocation, compilation of expression compilation of control structures, code optimization, interpreters. Software Tools: Software tools for program development, editors, debug monitors, programming environment, user interfaces

Text Books:

- 1.V. Rajaraman, “Fundamentals of Computers”, PHI.
- 2.Peter Norton’s, “Introduction to Computers”, TMH.
- 3.Operating Systems –Silberschatz and Galvin -Wiley India.
4. Andrew Tananbaum, Computer Networks:, PHI
5. PramodKoparkar “Unix for You”:, TMH.
6. MachteltGarrels, “Introduction to Linux”.
7. Sanders, D.: Computers Today, Tata McGraw-Hill

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Semester I & II (Batch 2022-26)

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ENG101	AEC	Foundation English	60	20	20	-	-	4	0	0	4

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

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Course Educational Objectives (CEOs): The students will

- CEO 1 Understand the different nuances of communication.
- CEO2 understand the features of listening and reading skills.
- CEO3 Comprehend the factors that influence use of grammar and vocabulary in speech and writing
- CEO4 study the essential aspects of effective written communication through Business letters and email writing for professional success.
- CEO5 Develop competency in professional communication.

Course Outcomes (COs): The students will be able to

- CO1 develop a comprehensive understanding of the theoretical and practical aspects of communication.
- CO2 understand and the different aspects of listening and reading.
- CO3 Apply grammatical rules in speech and writing.
- CO4 Use proper formats of written business communication.
- CO5 Demonstrate different strategies for using professional communication skills.

ENG101

Foundation English

COURSE CONTENTS

UNIT I

Communication

Communication: Nature, Meaning, Definition, Process, Functions and importance, Characteristics of Communication, Verbal and Non-Verbal Communication, Barriers to Communication.

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UNIT II

Listening and Reading Skills

Listening: Process, Types, Difference between Hearing and Listening, Benefits of Effective Listening, Barriers to Effective Listening, Overcoming Listening Barriers, and How to Become an Effective Listener, Developing Reading Skills: Reading Comprehension, Process, Active & Passive reading, Reading speed Strategies, Benefits of effective reading, SQ3R Reading technique.

UNIT III

Basic Grammar

Basic Language Skills: Grammar and usage- Parts of Speech, Tenses, Subject and Verb Agreement, Prepositions, Articles, Types of Sentences, Direct - Indirect, Active - Passive voice, Phrases & Clauses.

UNIT IV

Business Letters

Business Correspondence: Business Letters, Parts & Layouts of Business Letter, Job application and Resume, Application Calling/ Sending Quotations/ Orders/ Complaints. E-mail writing, Email etiquettes

UNIT V

Professional Skills

Negotiation Skills, Telephonic Skills, Interview Skills: Team building Skills and Time management

Suggested Readings:

- Adair John (2003). **Effective Communication**. London: Pan Macmillan Ltd.
- Thomson A.J. and Martinet A.V. (1991). **A Practical English Grammar** (4th ed). New York: Oxford IBH Pub
- Rizvi Ashraf (2005). **Effective Technical Communication**. New Delhi: Tata Mc Graw Hill
- Kratz Robinson (1995). **Effective Listening Skills**. Toronto: ON: Irwin Professional Publishing.

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