



Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Institute of Computer Applications

Name of the Program: BCA in Big Data Analytics in association with IBM



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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BCABDA101	Major	Software Foundation with C	2	0	2	3	60	20	20	30	20

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Course Objectives:

- To learn the basic logic and programming skills using C.
- To understand and develop modular programming skills.
- To understand the basic idea of Arrays and Pointers.
- To handle the Strings and implement the structures.
- To provide the knowledge of Files and preprocessor directives.

Course Outcomes: Students will be able to

- Describe Logic and programming skills.
- Describe Constructs, loops and arrays
- Describe and write the programs on of function, pointers and operators
- Implement the concepts of Arrays and Strings
- Implement programs of file handling and preprocessor directives.

UNIT- I

Introduction to C Programming: Background of C, Structure of a C program, C Tokens: **5 hrs** Identifiers, Variables, Constants, Keywords, Data Types, Operators; Control Constructs: if-else, for, while, do-while; Case switch statement; Break and Continue; Type conversion & type casting; Formatted & unformatted I/O; Type modifiers & storage classes.

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UNIT- II

Functions: Arguments; Return value; Parameter passing – call by value, call by reference; **8 hrs**
Return statement; Scope, visibility and life-time rules for various types of variable, static variable; Calling a function;

Recursion: Basic Introduction, types of recursion- direct, indirect;

UNIT- III

Arrays: Declaration and Initialization; Arrays as Function Parameters; 2-Dimensional Arrays. **6 hrs**

Introduction to Pointers: Introduction; Declaring Pointer Variables; & and * operators; pointer expressions; Pointer Increments and Scale Factor; Pointer Arithmetic; Pointers and Arrays; Dynamic Memory Management functions like malloc(), calloc(), free();

UNIT- IV

Strings: Introduction to Strings; Standard String Library Functions; Array of String. **6 hrs**

Structures: Introduction; Defining a structure; declaring structure variables; accessing structure members; structure initialization; array of structures.

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UNIT- V

File Management in C: Introduction; Defining and opening a file; closing a file; Input/output and Error Handling on Files.

5 hrs

Preprocessor: basics; #Include; #define; #undef; conditional compilation directive like #if, #else, #elif, #endif, #ifdef and #ifndef.

Text Books:

1. Kanitkar Yashwant, 'Let us C', BPB New Delhi
2. Balaguruswami, 'Ansi C', TMH, Delhi
3. Kerninghan & Ritchie "The C programming language", PHI
4. Schildt "C: The Complete reference" 4th ed TMH.
5. Cooper Mullish "The Spirit of C", Jaico Publishing House, Delhi.

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BCABDA103	Major	Software Foundation and Programming (1. Clean Coding; 2. Javascript; 3. NodeRed; 4. NodeJS)	2	0	2	3	60	20	20	30	20

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Course Objectives:

- Elevate your professionalism and increase your code quality
- Foundation for a professional development career
- Provide students a clear vocabulary for evaluating code quality.
- Understanding the basic ideas of programming
- Implementation of java script and node.js codes

Course Outcomes:

- Understand about the clean code, naming conventions and the importance of comments in the applications.
- Understand the purpose of formatting and objects.
- Describe JavaScript primitives and objects, variable declaration, control constructs and functions.
- Understand and describe the document object model (DOM) hierarchy, Node.js framework and projects and Master Express.js.
- Understand the basics of Node.js, connectivity and CRUD operations of Express.js with MongoDB and CRUD operations.

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Syllabus:

UNIT I

Introduction to Clean Coding

Understand the importance of bad and good code.

Understand the difference about marshalling and unmarshalling.

Exercise to implement JAXB.

Names and Functions

understand the importance of meaningful distinct names.

Defining meaningful context.

Usage of domain and function names

Usage of exceptions and its error code names/descriptions.

Exercise to experience in searchable names.

Comments and Formatting

Understand about clean and bad comments.

Understand the process of vertical and horizontal formatting.

Exercise on comments and formatting.

UNIT 2

Objects

Learn about data abstraction.

Understand the data and object antisymmetric.

Explain the data transfer objects.

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Javascript Basics

Nature of JavaScript language
Understand JavaScript primitive types.

Javascript objects

Understand Java Script Array Objects
Understand Java Script Date Objects
Understand Java Script Error Objects

UNIT 3

Javascript variables and Control statements

Understand how to define JavaScript Variables
Work Java Script If statements
Work Java Script switch statements Work
JavaScript for and while loop statements

Javascript Functions

Declare a JavaScript function
Creating custom objects with functions
Adding functions to prototypes
Self-executing functions

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UNIT 4

Client side Javascript

Understand Scripts in HTML documents
 Describe the document object model (DOM) hierarchy
 Overview of the DOM specification levels
 Describe the window and document objects
 Accessing document elements
 Common API in web and XML scripting

Node JS Introduction

Understand NodeJS and its features
 Understand Express Framework.
 Understand Key features of MongoDB

UNIT 5

Installation and Configuration

Install NodeJS on command line
 Hands on: Create sample NodeJS + Express project using command line
 Install Node eclipse plugin
 Hands-on: Create sample NodeJS + Express project using Eclipse

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File System

Understand `__dirname` and filename
 Understand synchronous vs Asynchronous file read
 Understand View Templates
 How to serve static content in NodeJS
 Connecting to the database using NodeJS

Install and Setup MongoDB

NodeJS Mongo Driver
 Perform CRUD Operation
 Understand Connection Pooling using NodeJS and Mongo Driver
 Hands on Develop Web Application using Node JS and Mongo DB

Text Book

- Mastering HTML, CSS & Javascript Web Publishing by Lemay Laura, BPB Publications, ISBN: 9788183335157, 9788183335157
- Javascript by Flanagan David, Packt publishers, ISBN: 9789350237311, 9789350237311
 Web technologies-black book by Dreamtech Press publications, ISBN-13 : 978-9351199076, ISBN-10 : 935119907X

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BCABDA103	Major	Software Foundation and Programming (1. Clean Coding; 2. Javascript; 3. NodeRed; 4. NodeJS)	2	0	2	3	60	20	20	30	20

Reference Book

- Java script by example by Dani Akash S, Kindle Edition
- Java script: the good parts by D Crockford, Kindle Edition
- IBM Study Materials

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

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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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