



डॉ० भीमराव आंबेडकर विश्वविद्यालय, आगरा  
(पूर्ववर्ती: आगरा विश्वविद्यालय, आगरा)

संख्या : शैक्षिक/590/2020  
दिनांक : 18.12.2020

सेवा में,

समस्त निदेशक/विभागाध्यक्ष,  
आवासीय संस्थान,  
डा० भीमराव आंबेडकर विश्वविद्यालय,  
आगरा।

विषय: पाठ्यक्रम 25 प्रतिशत कम करके विश्वविद्यालय की वेबसाइट पर अपलोड करने के सम्बन्ध में।  
महोदय,

कृपया उपर्युक्त विषयक कुलपति जी के आदेशानुसार आपको सूचित किया जाता है कि कोविड-19 को दृष्टिगत रखते हुये सत्र 2020-21 के लिए अपने संस्थान/सम्बद्ध महाविद्यालयों में संचालित सभी विषयों के पाठ्यक्रम को अपनी विभागीय एकेडेमिक कमेटी के माध्यम से 25 प्रतिशत कम कर 07 दिन के अन्दर वेबसाइट पर अपलोड कराने का कष्ट करें।

संलग्नक-यथोक्त।

भवदीय

  
कुलसचिव

प्रतिलिपि-

1. परीक्षा-नियंत्रक।
2. सहायक कुलसचिव, कुलपति कार्यालय।
3. गार्ड फाईल।

सहायक कुलसचिव (शैक्षिक)

In reference of University letter vide Acd.|590|2020 dated 18/12/2020 the 25% reduced syllabus of Bachelor of Computer Application (B.C.A.)for the session 2020-21 to be uploaded on concerned college login ID through the University website.



# **BACHELOR OF COMPUTER APPLICATION**

## **(B.C.A.)**

### **(THREE YEAR DEGREE COURSE)**

#### **with effect from session 2019-20**

# BACHELOR OF COMPUTER APPLICATION (B.C.A.)

## DETAILED SYLLABUS

### FIRST SEMESTER

### PAPER CODE: C-101

## Computer Fundamentals and MS-Office

#### UNIT-I

**Introduction to Computers:** Block diagram of computer. Types of computers and features, Mini Computers, Micro Computers, Mainframe Computers, Super Computers. Types of Programming Languages (Machine Languages, Assembly Languages, High Level Languages). Types of Memory (Primary and Secondary) RAM ROM, PROM, and EPROM. Secondary Storage Devices (FD, CD, HD, Pen drive) I/O Devices (Scanners, Plotters, LCD, Plasma Display) Number Systems Introduction to Binary, Octal, Hexadecimal system Conversion, Simple Addition, Subtraction, Multiplication.

#### UNIT-II

**Algorithm and Flowcharts** **Algorithm:** Advantages and disadvantages, **Flowchart:** Definition, Define symbols of flowchart.

#### UNIT-III

Services in O.S., DOS, Files and Directories, Batch Files, Types of O.S.

#### UNIT-IV

Features of MS-Windows, Control Panel, Icons, Windows Accessories, Paintbrush.

#### UNIT-V

Editors and Word Processors Basic Concepts, Examples: MS-Word. Spread sheets and Database packages Purpose, usage, command, Creation of files in MS-Access, MS-PowerPoint.

#### Suggested Books:

1. V.Rajaraman "Fundamental of Computers", B.P.B. Publications
2. P.K. Sinha "Fundamental of Computers"
3. Steve Sagman "MS-Office 2000(For Windows)"
4. Tennenbum Tata MacGraw "Computer Networks", Hill Publication

# BACHELOR OF COMPUTER APPLICATION (B.C.A.)

## DETAILED SYLLABUS

### FIRST SEMESTER

### PAPER CODE: C-102

## Introduction to Programming using C

### UNIT-I

**C basics:** C character set, Identifiers and keywords, Data types, constants, variables and arrays, declarations, arithmetic operators, unary operators, relational and logical operators, assignment operators, conditional operators.

### UNIT-II

**Decision Control Structures:** If Statement, If-else statement, Nested if (), Switch, case statement, Iterative statements: For loop, While loop, Do-while () loop, Conditional statements: Break. Array: Declaration of an Array, Initialization of Array, Types of Array: Single Dimension Array, Two, Dimensional Array, Address Calculation of an Element of a 2-D Array

### UNIT-III

**Functions:** Library Functions, User Defined Functions, Function Declaration, Types of Arguments: Actual Arguments, Formal Arguments, Function Definition, Passing Arrays as Parameters, Methods to Call a Function: Call by Value, Call by Reference.

### UNIT-IV

**Pointers:** Declaration of Pointer Variables, Pointer Arithmetic

### UNIT-V

Structures, Unions, Array of Structures, File Handling: Opening a File, Closing a File, File, Opening Modes, Reading from and Writing to a File, Copying Content of an Existing File to another.

### Suggested Books:

1. E.Balagurusamy, "Programming in ANSI C", TMH
2. Peter Norton's, "Introduction to Computers", TMH
3. Yashwant Kanetkar, "Let us C", BPB

# BACHELOR OF COMPUTER APPLICATION (B.C.A.)

## DETAILED SYLLABUS

### FIRST SEMESTER

### PAPER CODE: C- 103

## Business Communication and Soft Skills

### UNIT-I

**Means of Communication:** Process, Functions, Objectives, Importance, Communication barriers, 7C's of Communication, Types of Communication: Meaning, nature and scope.

### UNIT-II

**Oral communication:** Principle of effective oral communication Techniques of effective speech, Media of oral communication (Face, to, face conversation, Teleconferences, Press Conference, Demonstration, Radio Recording, Dictaphone, Meetings, Rumour, Demonstration and Dramatisation, Public address system, Grapevine, Group Discussion, Oral report, Closed circuit TV).

**Written Communication** Principle of Effective writing, Writing Techniques, Electronic Writing Process.

**Business Letters & Reports:** Need and functions of business letters, Kinds of business letters, Purpose, Kind and Objective of Reports, Writing Reports.

### UNIT-III

**Drafting of business letters:** Enquiries and replies, Placing and fulfilling orders, Complaints and follow, Circular letters Application for employment and resume.

**Information Technology for Communication:** Word Processor, Telex, Facsimile(Fax), E-mail, Voice mail, Internet Multimedia, Teleconferencing, Mobile Phone Conversation, Video Conferencing, SMS, Telephone Answering Machine, Advantages and limitations of these types.

**Self Analysis:** SWOT Analysis, Who am I, Attributes, Creativity: Out of box thinking, Lateral Thinking.

### UNIT-IV

**Attitude:** Factors influencing Attitude, Etiquette. Motivation: Factors of motivation, Self talk,. Goal Setting: Wish List, SMART Goals, Short Term, Long Term, Life Time Goals.

**Interpersonal Skills:** Gratitude: Understanding the relationship between Leadership Networking & Team work. Assessing Interpersonal Skills Situation description of Interpersonal Skill. Team Work: Necessity of Team Work Personally, Socially and Educationally.

## **UNIT-V**

**Leadership:** Skills for a good Leader, Assessment of Leadership Skills, Stress Management: Causes of Stress and its impact, Stress Busters.

**Emotional Intelligence:** What is Emotional Intelligence, Emotion Scales, Managing Emotions.

**Conflict Resolution:** Conflicts in Human Relations Approaches to conflict resolution. Decision Making: Importance and necessity of Decision Making, Weighing Positives & Negatives.

### **Suggested Books:**

1. K .K. Sinha "Business Communication",Galgotia Publishing Company, New Delhi.
2. C.S. Rayudu "Media and Communication Management", Hikalaya Publishing House, Bombay.
3. Rajendra Pal and J.S. Korlhalli,"Essentials of Business Communication", Sultan Chand & Sons, New Delhi.

# BACHELOR OF COMPUTER APPLICATION (B.C.A.)

## DETAILED SYLLABUS

### FIRST SEMESTER

### PAPER CODE: C-104

## Introduction to HTML, CSS- XML

#### UNIT-I

World Wide Web, Web page, Home page, Web site, Static, Dynamic and Active web page, Overview of Protocols, Simple Mail Transfer Protocol, Gopher, Telnet, Emails, TFTP, Hyper Text Transfer Protocol, Client server computing concepts. Web Client and Web Server Web Browser, **Browsers:** Internet Explorer, Mozilla Firefox, Client, Side Scripting Languages, VB Script and Java Script, Active X control and Plug-ins, Web Server Architecture, Image maps, CGI, API web database connectivity, DBC, ODBC

#### UNIT-II

Dynamic HTML, CSSP (Cascading Style Sheet Positioning) and JSSS (JavaScript assisted Style Sheet), Layers of Netscape, The ID Attribute.

#### UNIT-III

**Introduction to HTML:** Element, Attribute, Headings, Paragraphs, Styles, Formatting, Comments, CSS, Links, Images, Tables, Lists, Blocks, Classes, ID, frames, File Paths, Head, Entities, Symbols, Color and Background of Web Pages, Hypertext, Hyperlink and Hypermedia, Links, Anchors and URLs, Links to External Documents, Different Section of a Page and Graphics, Creating Table, Frame, Form and Style Sheet.

#### UNIT-IV

**CSS:** Syntax, Colors, Backgrounds, Borders, Margins, Padding, Height/ Width, Box Model, Outline, Text, Fonts, Icons, Links, Lists, Position, Overflow, Float, Inline, Block, Align, Navigation Bar, Dropdowns, Image Gallery, Image Sprites, Attr Selectors, Forms, Counters, Website Layout, Units, Specificity.

#### UNIT-V

**XML:** Elements, Attributes, Namespaces, Display, HTTP request, Parser, DOM, XPath, XSLT, XQuery, XLink, Validator, DTD, Schema, Server

#### Suggested Books:

1. Shelley Powers, "Dynamic Web Publishing" 2
2. Thomas A. Powell, "Html & CSS: The Complete Reference", 5th Edition
3. Heather Williamson, "XML: The Complete Reference"

**BACHELOR OF COMPUTER APPLICATION (B.C.A.)**  
**DETAILED SYLLABUS**  
**FIRST SEMESTER**  
**PAPER CODE: C-105**  
**Mathematics -I**

**UNIT-I**

**Determinants:** Definition, Minors, Cofactors, Properties of Determinants

**Matrices:** Definition, Types of Matrices, Addition, Subtraction, Scalar Multiplication and Multiplication of Matrices, Cramers Rule, Rank of Matrix Dependence of Vectors

**UNIT-II**

**Limits & Continuity:** Limit at a Point, Properties of Limit, Computation of Limits of Various Types of Functions, Continuity at a Point, Type of Discontinuities

**UNIT-III**

**Differentiation:** Derivative, Derivatives of Sum, Differences, Product and Quotients, Chain Rule, Rolle's Theorem, Mean Value Theorem, Expansion of Functions (Maclaurin's and Taylor's), Indeterminate Forms, L-Hospitals Rule, Maxima and Minima.

**UNIT-IV**

**Integration:** Integral as Limit of Sum, Fundamental Theorem of Calculus( without proof.), Indefinite Integrals, Methods of Integration Substitution, by Parts, Partial Fractions.

**UNIT-V**

**Vector Algebra:** Definition of a vector in 2 and 3 Dimensions, Double and Triple Scalar and Vector Product .

**Suggested Books:**

1. B.S. Grewal, "Elementary Engineering Mathematics", 34th Ed., 1998.
2. Shanti Narayan, "Integral Calculus", S. Chand & Company, 1999
3. H.K. Dass, "Advanced Engineering Mathematics", S. Chand & Company, 9th Revised Edition, 2001.
4. Gorakh Prasad and Chandrika Prasad, "Differential and Intigration"



**BACHELOR OF COMPUTER APPLICATION (B.C.A.)**  
**DETAILED SYLLABUS**  
**SECOND SEMESTER**  
**PAPER CODE: C-201**

**Object Oriented Programming Using C++**

**UNIT-I**

**Introduction:** Introducing Object Oriented Approach. Basic concept of OOPs, operators, tokens, variables, Keywords, Data types, identifiers, characters, typedef statement, constants, Enumerated data type.

**UNIT-II**

**Control Flow:** If statement, If Else statement, Nested If, Else, Statements, For Loop, While Loop, Do. Classes and Objects, Encapsulation, information hiding, abstract data types, attributes, methods, C++ class declaration, Constructors and destructors, Default parameter value, object types, dynamic memory allocation.

**UNIT-III**

**Array:** Array Illustration, Multi- Dimensional arrays, Strings, Array of Strings, Function prototype, function return data type, Default argument, Inline function, Function Overloading, Operator Overloading,

**UNIT-IV**

**Pointers:** Pointer to Derived Class, array of Pointers, Inheritance and Polymorphism: Inheritance, Class hierarchy, derivation, public, private & protected, abstract Classes.

**UNIT-V**

**Files and Exception Handling:** Streams and files, Namespaces.

**Suggested Books:**

1. A.R.Venugopal, Rajkumar, T. Ravishanker "Mastering C++", TMH, 1997.
- 2.S.B.Lippman&J.Lajoie," C++ Primer",3<sup>rd</sup>Edition, Addison Wesley, 2000.The C programming Lang.,Person Ecl,Dennis Ritchie
3. R.Lafore,"Object Oriented Programming using C++",Galgotia Publications,2004
4. D.Parasons,"Object Oriented Programming using C++",BPB Publication

**BACHELOR OF COMPUTER APPLICATION (B.C.A.)**  
**DETAILED SYLLABUS**  
**SECOND SEMESTER**  
**PAPER CODE: C-202**  
**Digital Electronics**

**UNIT-I**

**Number System & Boolean Algebra:** Number System: Binary, Octal, Decimal, Hexadecimal, Conversion of Number System, Binary Arithmetic & Complement, Boolean Function, Boolean Postulates, De-Morgan's Theorem, Boolean Expressions: Sum of Product, Product of Sum, Minimization of Boolean Expressions using K-Map, Logic Gates: AND, OR, NOT, NAND, NOR, XOR, XNOR.

**UNIT-II**

**Combinational Circuits:** Adders & Subtractors: Half Adder, Full Adder, Binary Adder, Half Subtractor, Full Subtractor, Magnitude Comparator: Two Bit Magnitude Comparator, Three Bit Magnitude Comparator, Multiplexer & De-Multiplexer.

**UNIT-III**

**Sequential Circuit:** Introduction to Flip Flops: SR, JK, Master Slave Flip Flops, Conversion of Flip Flops, Characteristic Table & Equation, Excitation Table, State Diagram, State Table, State Reduction.

**UNIT-IV:**

**Registers:** Introduction of Registers, Classification of Registers, Register with Parallel Load, Shift Registers.

**UNIT-V:**

**Counters:** Introduction of Counter, Asynchronous/Ripple Counters, Synchronous Counters, Ring Counter, Johnson Counter.

**Suggested Books:**

1. M.M. Mano "Digital Logic and Computer design" (PHI) 1998
2. M.M. Mano "Computer Architecture" (PHI) 1998
3. Malvino and Lea "Digital Electronics" (TMH) 1998

# BACHELOR OF COMPUTER APPLICATION (B.C.A.)

## DETAILED SYLLABUS

### SECOND SEMESTER

### PAPER CODE: C-203

## Data Structure Using 'C'/'C++'

#### UNIT-I

Classification of Data Structure, Operations on Data Structure, Address Calculation, Application of arrays, Application of Arrays.

#### UNIT-II

**Continuous Implementation (Stack):** Array Representation, Operations on Stacks: Push & Pop, Applications of stack, Conversion of Infix to Prefix and Postfix Expressions, Evaluation of postfix expression using stack

**Recursion:** Recursive Definition and Processes Recursion Vs. Iteration Continuous. Implementation (Queue): Array representation and implementation of Queues.

#### UNIT-III

**Non Continuous Implementation:** Link Lists: Linear List concept, Linked List Terminology, Representation of Linked List in Memory, Types of Linked List, Single Linked List, Doubly Linked List, Operations on Link List: Create List Insert node (empty list, beginning, middle, end), Delete node (first, general case), Print list, Count Nodes, Sort Lists.

#### UNIT-IV:

**Trees:** Introduction to Tree & its Terminology, Binary trees, Types of Binary trees, Representation of Binary Tree, Traversals (Inorder, Preorder, Postorder), Tree Expression.

#### UNIT-V:

**Sorting & Searching Techniques:** Bubble Sort, Insertion Sort, Quick Sort, Sequential Search, Binary Search.

### Suggested Readings:

1. S. Lipschutz, "Data structures", Mc, Graw, Hill International Editions, 1986.
2. A. Michael Berman, "Data Structures via C++", Oxford University Press, 2002.
3. M. Weiss, "Data Structures and Algorithm Analysis in C++", Pearson Education

**BACHELOR OF COMPUTER APPLICATION (B.C.A.)**  
**DETAILED SYLLABUS**  
**SECOND SEMESTER**  
**PAPER CODE: C-204**  
**Principles of Management**

**UNIT-I**

**Nature of Management:** Meaning, Definition, it's nature purpose, importance & Functions, Concepts of management, Administration, Organization, Evolution of Management.

**UNIT-II**

**Functions of Management:** Planning - Meaning - Need & Importance, type's levels, advantages & limitations. Forecasting - Need & Techniques Decision making Types.

**UNIT-III**

**Elements of organizing & processes:** Types of organizations, Delegation of authority - Need, difficulties in delegation - Decentralization Staffing - Meaning & Importance Direction, Types & Importance. Leadership - Meaning - styles, qualities & functions of leaders

**UNIT-IV**

**Functions of Management:** Controlling - Need, Nature, importance, Process & Techniques Coordination - Need – Importance, Strategic Management Definition, Classes of Decisions, Levels of Decision, Strategy, Role of different Strategist.

**UNIT-V**

**Recent Trends in Management:** Social Responsibility of Management – environment friendly management, Stress Management International Management

**Suggested Books:**

1. Horold Koontz and Iteinz Weibrich-“ Essential of Management” – McGraw hills International
2. J.N.Chandan “Management Theory & Practice “
3. K. Aswathapa “Essential of Business Administration” - Himalaya Publishing House

**BACHELOR OF COMPUTER APPLICATION (B.C.A.)**  
**DETAILED SYLLABUS**  
**SECOND SEMESTER**  
**PAPER CODE: C-205**  
**Numerical Methods**

**UNIT-I**

**Roots of Equations:** Bisections Method, Newton's Raphson Method, Rate of convergence of Newton's method.

**UNIT-II**

**Interpolation and Extrapolation :** Finite Differences, The operator E-Newton's Forward and Backward Differences, Newton's dividend differences formula, Lagrange's Interpolation formula for unequal Intervals, Laplace, Everett formula.

**UNIT-III**

**Numerical Differentiation Numerical Integration :** Introduction, direct methods, maxima and minima of a tabulated function, Trapezoidal rule, Simpson's One third rule.

**UNIT-IV**

**Solution of Linear Equation:** Gauss's Elimination method.

**UNIT-V**

**Solution of Differential Equations:** Euler's method, Fourth-order Ranga Kutta method.

**Suggested Books:**

1. Scarbourogh, "Numerical Analysis".
2. Gupta & Bose S.C. "Introduction to Numerical Analysis, "Academic Press, Kolkata,
3. S.S.Shashtri, "Numerical Analysis", PHI

**BACHELOR OF COMPUTER APPLICATION (B.C.A.)**  
**DETAILED SYLLABUS**  
**THIRD SEMESTER**  
**PAPER CODE: C-301**  
**Data Base Management System**

**UNIT-I**

**Introduction:** Database System Concepts, Database Users, Components of Database System, Database Users, Advantages and disadvantages of Using a DBMS, Database Schemas and Instances , DBMS Architecture, Data Independence, Database Languages and Interfaces, Classification of Database Management Systems.

**UNIT-II**

Data Modelling & Relational Database Management System ,Entity Relationship Model: Entity Types, Entity Sets, Attributes, Keys, Relationships, Relationship Types, Roles, and Structural, Constraints, Weak Entity Types, ER Diagrams,

**UNIT-III**

**The Relational Data Model:** Relational Algebra: Relational Model Concepts, Relational Constraints and Relational Database Schemas Update Operations Basic Relational Algebra Operations, Additional Relational Operations, Examples of Queries in Relational Algebra.

**UNIT-IV**

**SQL:**SQL and Database Design Theory and Methodology Structured Query Language The Relational Database Standard: Data Definition, Constraints and Schema, Types of SQL Commands, SQL Operators and their Procedure, Insert, Delete, and Update Statements in SQL Queries and Sub Queries, Aggregate Functions, Joins, Unions, Intersection, Minus. Functional Dependencies and Normalization Closure of Attributes, Normal Forms Based on Primary Keys, General Definitions of Second and Third Normal Forms, Boyce Codd Normal Form.

**UNIT-V**

**Transaction Processing:** Concurrency Control and Distributed Database Transaction Processing Concepts: Introduction to Transaction Processing, Desirable Properties of Transactions, Concurrency Control Techniques, Concurrency Control Based on Timestamp Ordering.

**Suggested Books:**

1. A.K. Majumdar, P. Bhattacharya, "Database Management Systems", TMH, 1996.
2. Bipin Desai, "An Introduction to database systems", Galgotia Publications, 1991

# BACHELOR OF COMPUTER APPLICATION (B.C.A.)

## DETAILED SYLLABUS

### THIRD SEMESTER

#### PAPER CODE: C-302

#### E-Commerce and ERP

#### UNIT-I

**Introduction:** Benefits of E-Commerce, Goals of Electronic Commerce, Main Components of E- Commerce, Communication, Process Management, Service Management, Process of E- Commerce, Types of E- Commerce, Role of Internet and Web in E- Commerce, Technologies Used in E- Commerce Systems, E- Business Models.

#### UNIT-II

**E-Commerce Activities:** Various Activities of E- Commerce, Elements and Resources Impacting E- Commerce and Changes, Man Power Associated with E- Commerce Activities, Opportunity Development for E- Commerce Stages, Development of E-Commerce Business Case, Components and Factors for the Development of the Business Case, Steps to Design and Develop an E- Commerce Website.

#### UNIT -III

**Internet:** Networking Categories, Characteristics of Internet, Components of Internet, Internet Services, Elements of Internet, Uniform Resource Locators, Internet Protocol, Shopping Cart, Cookies and E- Commerce, Web Site Communication. Implementation of **E- Commerce:** WWW.EBAY.COM, B2C Website- Registration, Time factor, Bidding process, Growth of eBay, PayPal.

#### UNIT-IV

**ISP, WWW and Portals:** Internet Service Provider (ISP), World Wide Web (WWW), Portals, Steps to build homepage, Metadata, Advantages of Portal, Enterprise Information Portal (EIP).

**E-Marketing:** Traditional Marketing, E- Marketing, Maintaining a Website, Online Marketing, Advantages of Online Marketing. Content: format and access, Maintaining a Website- Metrics Defining Internet Units of Measurement, Online Marketing, Advantages of Online Marketing.

**E- Security:** Security on the Internet, Network and Website Security Risks, Viruses, Unauthorized access to a computer network, Network and Website Security, Transaction security and data protection, Security audits and penetration testing, E- Business Risk Management Issues, Firewall, Network policy, Advanced authentication mechanism, Packet filtering, Application gateways, Defining Enterprise Wide Security Framework.

## **UNIT -V**

E- Payment Systems: Electronic Funds Transfer, Digital Token Based E- Payment Systems, Steps for Electronic Payment, Payment Security, Net Banking, Customer Relationship Management (CRM), CRM Processes, Event triggers, business logic and rules repository, Decision support tools, Higher level statistical analysis, Forecasting and planning tools, Workflow management, Collateral management, Architecture and Applications of Electronic CRM.

### **Suggested Books:**

1. K Vaitheeswaran "The Story of India's First E-Commerce Company"
2. David Whiteley "E – Commerce: Strategy, Technologies and Applications"
3. P T Joseph "E-Commerce: An Indian Perspective"



# BACHELOR OF COMPUTER APPLICATION (B.C.A.)

## DETAILED SYLLABUS

### THIRD SEMESTER

### PAPER CODE: C- 303

## Computer Organization and Architecture

### UNIT I

**Computer Evolution:** Von Neumann Architecture. Integer Addition and Subtraction ,Floating point representation., Signed numbers, Binary Arithmetic, 1's and 2's Complements , Booths Algorithm, Hardware Implementation, IEEE Standards, Floating Point Arithmetic , The accumulator, Shifts, Carry and Overflow. Instruction Characteristics, CPU with Single BUS, Types of Operands, Types of Operations, Addressing Modes, Instruction Formats.

### UNIT II

**Processor Organization:** Parallelism and Computer arithmetic, Computer arithmetic associatively. Register Organization, 8086 Registers, Instruction Cycles, Addressing Modes. The Instruction cycle, Control of the CPU, Functional Requirements, Single, Two, Three bus structure, Execution of a complete instruction, Branching, Sequencing of Control Signals, Hardwired Control Unit, Micro-Programmed Control.

### UNIT III

**Memory Organization:** Characteristics of Memory Systems, Types of Memory, Design of memory subsystem using Static, Dynamic Memory Chips, Memory interleaving

**High Speed Memories:** Cache Memory, Structure of cache and main memory, Elements of Cache Design, Mapping functions, Replacement algorithms, External Memory, Virtual memory

### UNIT IV

**I/O Organization:** Input / Output Module: Need, Techniques, Interrupt Driven I/O, Basic concepts of an Interrupt , Response of CPU to an Interrupt, Design Issues, Priorities, Interrupt handling, Types of Interrupts. Data Transfer Techniques, Data Memory Access, Buses, Types of buses, I/O Interface, Synchronous and Asynchronous Data Transfer, Serial I/O, Multiprogramming vs. Multiprocessing

## **UNIT V**

**Microprogramming:** Basic Principles, Features ,Applications and advantages of microprogramming, Limitations of microprogramming, Parallel Organization, Instruction Set Architecture (ISA), RISC and CISC, Characteristics of CISC, Characteristics of RISC, RISC versus CISC, Vector Processing Requirements and Characteristics of vector processing.

### **Suggested Books:**

1. Stallings "Computer Organization & Architecture"
2. William Stallings "Computer Organization and Architecture: Designing for Performance"
3. John Hayes "Computer Architecture and Organization"

# BACHELOR OF COMPUTER APPLICATION (B.C.A.)

## DETAILED SYLLABUS

### THIRD SEMESTER

### PAPER CODE: C-304

## Operating System with the case study of UNIX & Windows

### UNIT-I

**Introduction:** What is an operating system, Simple Batch Systems, Multi, programmed Batch systems, Time, Sharing Systems, Parallel systems, Distributed systems, Real, Time Systems.

**Memory Management:** Background, Paging, Segmentation Virtual Memory: Demand Paging, Page Replacement, Page, replacement Algorithms, Performance of Demand Paging, Allocation of Frames, Thrashing.

### UNIT-II

**Processes:** Process Concept, Process Scheduling, Operation on Processes, CPU Scheduling: Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Synchronization Hardware, Semaphores, Classical Problems of Synchronization

**Deadlocks:** System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock .

### UNIT-III

**Device Management:** Techniques for Device Management, Dedicated Devices, Virtual Devices, Storage Devices, Buffering, Secondary Storage Structure: Disk Structure, Disk Scheduling, Disk Management, Swap, Space Management.

**Information Management:** Introduction, A Simple File system, General Model of a File System, Symbolic File System, Basic File System, Access Control Verification, Logical File System, Physical File system File, System Interface, File Concept, Access Methods, file, System Structure, Allocation Methods, Free, Space Management.

### UNIT-IV

**Unix:** A Sample Login Session, Logging On, Using the On-line Man Pages, Logging Off, Directory and File Structure, File Names, Directories, The df Program, Your Login Directory, Subdirectories, Specifying Files, Protecting Files and Directories, Text Editors

## **UNIT-V**

Windows accessories. Managing multiple windows, arranging icons on the desktop, creating and managing folders, managing files and drives, logging off and shutting down windows. Entertainment CD Player, VD Player, Media Player, Sound Recorder, Volume Control

### **Suggested Books:**

1. Silber sachatz and Galvin, "Operating System Concepts", Person, 5th Ed. 2001
2. Madnick E., Donovan J., "Operating Systems:", Tata McGraw Hill, 2001
3. R K Taxali "P C Software for Windows"
4. Yashavant P Kanetkar "Unix Shell Programming"

**BACHELOR OF COMPUTER APPLICATION (B.C.A.)**  
**DETAILED SYLLABUS**  
**THIRD SEMESTER**  
**PAPER CODE: C-305**  
**Statistical Method and Application**

**UNIT I**

Classification of data, Tabulation of data, Preparation of frequency distribution, Presentation of data through histogram, frequency polygon, frequency curve

**UNIT II**

**Measures of Central Tendency:** Computation of Arithmetic mean, median and mode for ungrouped data and grouped data.

**UNIT III**

Measures of dispersion: Computation of Range, Quartile deviation, mean deviation and Standard deviation

**UNIT IV**

Concept of Skewness, Karl Pearson's Coefficients of Skewness(Numerical Applications Only)

**UNIT V**

Meaning of Correlation, types of correlation, correlation coefficient, Karl Pearson correlation coefficient. (Numerical Applications Only)

**Suggested Books:**

1. Dr.S.P. Gupta "Statistical Methods" SultanChand&Sons.
2. C. Sathyadevi,S. Chand "Quantitative Techniques"
3. S.C.Gupta& V.K.Kapoor, Sultan Chand "Fundamental of Mathematical Statistics"
4. SnedecorG.W.&CochranW.G.oxford&+DII "Statistical Methods"
5. Mode.E.B."Elements of Statistics", PrenticeHall

# BACHELOR OF COMPUTER APPLICATION (B.C.A.)

## DETAILED SYLLABUS

### FOURTH SEMESTER

### PAPER CODE: C-401

### Java Programming

#### UNIT-I

Introduction, Java Tokens, Java Statements, Command Line Arguments. Constants, Variables and Data Types Constants, Variables, Data Types, Declaration of Variables, Giving Values of Variables, Scope of Variables, Type Casting, Getting Values of Variables, Java Program Structure, Java Virtual Machine.

#### UNIT-II

**Operators, Expressions and Statements:** Arithmetic Operators, Relational Operators, Assignment Operators, Conditional Operators, Bitwise Operators, Special Operators, Arithmetic Expressions, Precedence of Arithmetic Operators. **Decision Making and Branching:** Introduction, Decision Making with if Statement, Simple if Statement, Nesting of if ... else Statements, else if Ladder, switch Statement. **Decision Making and Looping:** Introduction, while Statement, do Statement.

#### UNIT-III

**Classes, Objects and Methods:** Defining a Class, Creating Objects, Accessing Class Members, Constructors, Methods Overloading, Static Members, Nesting of Methods, Inheritance: Extending a Class, Overriding Methods, Finalize Methods, Abstract Methods and Classes, Visibility Control. Arrays, Creating an Array, Two Dimensional Arrays, Strings, Wrapper Classes.

#### UNIT-IV

**Interfaces and Packages:** Defining Interfaces, Extending Interfaces, implementing Interfaces, Accessing Interface Variables.

**Packages:** Introduction, Java API Packages, Using system Packages, Naming Conventions, Creating Packages, Accessing a Packages, Using a Package, Adding a Class to a Package. **Multithreaded Programming:** Introduction, Creating Threads, Extending the Thread Class, Stopping and Blocking a Thread, Life Cycle of a Thread, Using Thread Methods, Thread Exceptions.

## **UNIT-V**

**Applet Programming:** Introduction, Preparing to Write Applets, Building Applet Code, Applet Life Cycle, Creating an Executable Applet, Designing a Web Page, Applet Tag, Adding Applet to HTML File, Running the Applet. Managing Errors and Exceptions: Introduction, Types of Errors, Exceptions, Syntax of Exception Handling Code, Using finally Statement, Throwing Our Own Exceptions.

### **Suggested Books:**

- 1.E. Balagurusamy, "Programming with Java", A Primer Second Edition, Tata McGraw Hill, New Delhi.
- 2.P.Naughton and H. Schildt, "JAVA: The Complete Reference", TMH, New Delhi 2005.
- 3.D.Jana, Java and "Object Oriented Programming Paradigm", PHI, New Delhi, 2005

# BACHELOR OF COMPUTER APPLICATION (B.C.A.)

## DETAILED SYLLABUS

### FOURTH SEMESTER

### PAPER CODE: C-402

## Web Technology using PHP and MYSQL

### UNIT I

**PHP:** Introduction to PHP Evaluation of PHP, Basic Syntax, Defining variable and constant, PHP Data type, Operator and Expression. Doing Repetitive task with looping.

**Function:** Define a function, Call by value and Call by reference, Recursive function, String Creating and accessing, String Searching & Replacing String, Formatting String.

### UNIT II

**Array:** Anatomy of an Array, Creating index based and Associative array Accessing array, Looping with associative array using each () and for each(), Some useful Library function. Handling Html Form with PHP Capturing Form, Data Dealing with Multi-value filed, and Generating File uploaded form.

### UNIT III

**Working with file and Directories:** Understanding file& directory, Opening and closing a file, Coping, renaming and deleting a file, File Uploading & Downloading.

### UNIT IV

**Session and Cookie:** Introduction to Session Control, Session Functionality What is a Cookie, Setting Cookies with PHP. Using Cookies with Sessions, Deleting Cookies, Registering Session variables.

### UNIT V

**MySQL:** Introduction to RDBMS, Connection with MySQL Database, Performing basic database operation (DML) (Insert, Delete, Update, Select), Setting query parameter, Executing query Join (Cross joins, Inner joins, Outer Joins, Self joins.) Error tracking and debugging.

### Suggested Books:

1. O riley Press "Learning PHP, MySQL"
2. W. Jason Gilmore"Beginning PHP and MySQL by"



**BACHELOR OF COMPUTER APPLICATION (B.C.A.)**  
**DETAILED SYLLABUS**  
**FOURTH SEMESTER**  
**PAPER CODE: C- 403**  
**Artificial Intelligence**

**UNIT-I**

AI Concepts, Various definitions of AI, Knowledge, Knowledge Pyramid, People and Computers: What computers can do better than people, what people can do better than computers, Characteristics of AI Problems, Components of AI, AI Evolution, Application Areas of AI.

**UNIT-II**

**Expert System:** Components of Expert System: Knowledge Base, Inference Engine, User Interface, Features of Expert System, Expert System Life Cycle, Categories of Expert System, Advantages/Limitations of Expert System, Developing an Expert System: Identification, Conceptualization, Formalization, Implementation, Testing, Using an Expert System.

**UNIT-III**

**AI and Search Process:** Brute Force Search, Depth First/Breadth First Search, Heuristic Search: Hill Climbing, Constraint Satisfaction, Mean End Analysis, Best First Search.

**UNIT-IV**

**Natural Language Processing:** Introduction, Need, Goal, Fundamental Problems in Natural Language Understanding,

**Speech Recognition:** Introduction, Advantages and Approaches, Introduction to Robotics: Parts of a Robot.

**UNIT-V**

**Applications:** Communication, Formal grammar for a fragment of English, Syntactic analysis, Augmented grammars, Semantic interpretation, Discourse understanding, Grammar induction, Probabilistic language processing, Probabilistic language models, Information retrieval, Machine Translation.

**Suggested Books:**

1. V S Janakiraman, "Foundation of Artificial Intelligence and Expert Systems"
2. Dan W. Patterson, "Introduction to Artificial Intelligence and Expert Systems"

**BACHELOR OF COMPUTER APPLICATION (B.C.A.)**  
**DETAILED SYLLABUS**  
**FOURTH SEMESTER**  
**COURSE CODE: C-404**  
**Computer Network**

**UNIT I**

**Introduction:** Definition of a Computer Network, Components of a computer network, Types of Network: Based on Topology (Bus, Star, Ring Mesh, Tree), Based on Size Technology and ownership (LAN, MAN, WAN). Network topologies, Linear Bus Topology, Ring Topology, Star Topology, Switching, Circuit switching, Message switching, Packet switching, Implementation of packet switching, Relationship between Packet Size and Transmission time, Comparison of switching techniques: Multiplexing, FDM, Frequency division multiplexing.

**UNIT II**

**Network Software & Network Standardization:** Introduction: Networks Software, Protocol hierarchy, Service Primitives: Reference models, The OSI Reference Model, The TCP/IP Reference Model, Comparison of the OSI & the TCP/IP Reference Model

**UNIT III**

**Data Link Layer:** Services provided to the Upper Layer, Framing, Error Control, Flow Control, IEEE Standards for MAC Sub layer, Network Layer: Services provided to the Upper Layer: Routing Algorithms (Centralized, Distributed).

**UNIT IV**

**Data Communications: Introduction:** Theoretical basis for communication, Fourier analysis, Band limited signals, Maximum data rate of a channel: Transmission impairments, Dispersion, Noise: Data transmission modes, Serial & Parallel, Simplex, Half duplex & full duplex.

**UNIT V**

**Transmission Medium:** Introduction: Transmission medium, Guided & Unguided Transmission medium, Twisted pair, Optical fiber, Wireless transmission.

**Suggested Books:**

1. W. Stallings, "Data and Computer Communication", Pearson Education.
2. A. S. Tanenbaum, "Computer Network", 4th, Edition, Pearson Education.
3. Forouzan, "Data Communication and Networking", 2nd Edition, Tata McGraw Hill.

**BACHELOR OF COMPUTER APPLICATION (B.C.A.)**  
**DETAILED SYLLABUS**  
**FOURTH SEMESTER**  
**PAPER CODE: C-405**  
**Optimization Techniques**

**UNIT-I**

Basics of operation research (OR): Characteristics of OR, OR and decision making. Linear Programming: Formulations and graphical solution of (2 variables) canonical and standard terms of linear programming problem.

**UNIT-II**

**Algebraic solution:** Simplex methods.

**UNIT-III**

**Transportation Model:** Definition, formulation and solution of transportation models, The row, minima, column, minima, matrix, minima and Vogel's approximation methods. Assignment model: Definition of assignment model, comparison with transportation model, formulation and solution of assignment model.

**UNIT-IV**

Sequencing Problem: Processing of n jobs through 2 machines, processing n jobs through 3 machines.

**UNIT-V**

**Game Theory:** Characteristics of games, maxima, minimax criteria of optimality, algebraic and graphical method of solution of solving 2 x 2 games.

**Suggested Books:**

1. KantiSwarup "Introduction to Management Science Operations Research".
2. V. K. Kapoor "Operations Research Quantitative Techniques For Management".
3. Mokhtar S Bazara and C M Shetty "Nonlinear Programming: Theory and Algorithms".