

## □ Semester-III<sup>rd</sup>

| Course Code | Course Name                                    | External | Internal | Total | L | T | P | C     |
|-------------|--|----------|----------|-------|---|---|---|-------|
| BCA-S201T   | Object Oriented Programming Using C++          | 75       | 25       | 100   | 3 | 0 | 0 | 3     |
| BCA-S202T   | Data Structure Using C & C++                   | 75       | 25       | 100   | 3 | 0 | 0 | 3     |
| BCA-S203    | Computer Architecture & Assembly Language      | 75       | 25       | 100   | 3 | 1 | 0 | 4     |
| BCA-S204    | Business Economics                             | 75       | 25       | 100   | 3 | 1 | 0 | 4     |
| BCA-S205    | Elements of Statistics                         | 75       | 25       | 100   | 3 | 1 | 0 | 4     |
| BCA-S201P   | Computer Laboratory and Practical Work of OOPS | -        | -        | 50    | 0 | 0 | 3 | 2     |
| BCA-S202P   | Computer Laboratory and Practical Work of DS   | -        | -        | 50    | 0 | 0 | 3 | 2     |
|             |  |          |          | 600   |   |   |   | 22 22 |

# Bachelor of Computer Applications

Course Code    Course Name  
BCA-S201T    Object Oriented Programming Using C++

L T P C  
3 0 0 3

## UNIT-I

### Introduction

Introducing Object – Oriented Approach, Relating to other paradigms {Functional, Data decomposition}.

### Basic terms and ideas

Abstraction, Encapsulation, Inheritance, Polymorphism, Review of C, Difference between C and C++  
- cin, cout, new, delete, operators.

## UNIT-II

### Classes and Objects

Encapsulation, information hiding, abstract data types, Object & classes, attributes, methods, C++ class declaration, State identity and behaviour of an object, Constructors and destructors, instantiation of objects, Default parameter value, object types, C++ garbage collection, dynamic memory allocation, Metaclass / abstract classes.

## UNIT-III

### Inheritance and Polymorphism

Inheritance, Class hierarchy, derivation – public, private & protected, Aggregation, composition vs classification, hierarchies, Polymorphism, Categorization of polymorphism techniques, Method polymorphism, Polymorphism by parameter, Operator overloading, Parametric Polymorphism

## UNIT-IV Generic

### function

Template function, function name overloading, overriding inheritance methods, Run time polymorphism, Multiple Inheritance.

## UNIT-V

### Files and Exception Handling

Streams and files, Namespaces, Exception handling, Generic Classes

### Reference 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., Pearson Ecl – Dennis Ritchie
3. R.Lafore, “Object Oriented Programming using C++”, Galgotia Publications, 2004
4. D.Parsons, “Object Oriented Programming using C++”, BPB Publication.

# Bachelor of Computer Applications

|             |                              |   |   |   |   |
|-------------|------------------------------|---|---|---|---|
| Course Code | Course Name                  | L | T | P | C |
| BCA-S202T   | Data Structure Using C & C++ | 3 | 0 | 0 | 3 |

## UNIT-I

Introduction to Data Structure and its Characteristics Array

Representation of single and multidimensional arrays; Sparse arrays – lower and upper triangular matrices and Tridiagonal matrices with Vector Representation also.

## UNIT-II

Stacks and Queues

Introduction and primitive operations on stack; Stack application; Infix, postfix, prefix expressions; Evaluation of postfix expression; Conversion between prefix, infix and postfix, introduction and primitive operation on queues, D- queues and priority queues.

## UNIT-III

Lists

Introduction to linked lists; Sequential and linked lists, operations such as traversal, insertion, deletion searching, two way lists and Use of headers

## UNIT-IV

Trees

Introduction and terminology; Traversal of binary trees; Recursive algorithms for tree operations such as traversal, insertion, deletion; Binary Search Tree

## UNIT-V

B-Trees

Introduction, The invention of B-Tree; Statement of the problem; Indexing with binary search trees; a better approach to tree indexes; B-Trees; working up from the bottom; Example for creating a B-Tree

## UNIT-VI

Sorting Techniques; Insertion sort, selection sort, merge sort, heap sort, searching Techniques: linear search, binary search and hashing

### Reference Books:

1. E.Horowitz and S.Sahani, "Fundamentals of Data structures", Galgotia Book source Pvt. Ltd., 2003
2. R.S.Salaria, "Data Structures & Algorithms", Khanna Book Publishing Co. (P) Ltd.,2002
3. Y.Langsam et. Al., "Data Structures using C and C++", PHI, 1999

# Bachelor of Computer Applications

|             |   |   |   |   |   |
|-------------|---|---|---|---|---|
| Course Code | Course Name                               | L | T | P | C |
| BCA-S203    | Computer Architecture & Assembly Language | 3 | 1 | 0 | 4 |

## UNIT-I

Basic computer organization and design, Instructions and instruction codes, Timing and control/ instruction cycle, Register/ Types of register/ general purpose & special purpose registers/ index registers, Register transfer and micro operations/ register transfer instructions, Memory and memory function, Bus/ Data transfer instructions, Arithmetic logic micro-operations/ shift micro-operations, Input/ Output and interrupts, Memory reference instructions, Memory interfacing , Cache memory.

## UNIT-II

### Central Processing Unit

General Register Organization/ stacks organizations, instruction formats, addressing modes, Data transfer and manipulation. Program control, reduced computer, pipeline/ RISC/ CISC pipeline vector processing/ array processing.

Arithmetic Algorithms: Integer multiplication using shift and add, Booth's algorithm, Integer division, Floating-point representations.

## UNIT-III

### Computer Arithmetic

Addition, subtraction and multiplication algorithms, divisor algorithms. Floating point, arithmetic operations, decimal arithmetic operations.

## UNIT-IV

### Input – Output Organization

Peripheral devices, Input/output interface, ALU Asynchronous Data transfer, mode of transfer, priority interrupts, Direct memory Address (DMA), Input/ Output processor (IOP), serial communication.

## UNIT-V

### Evaluation of Microprocessor

Overview of Intel 8085 to Intel Pentium processors, Basic microprocessors, architecture and interface, internal architecture, external architecture memory and input/ output interface.

## UNIT-VI

Assembly language, Assembler, Assembly level instructions, macro, use of macros in I/C instructions, program loops, programming arithmetic and logic subroutines, Input-Output programming.

### Reference Books:

1. Leventhal, L.A, "Introduction to Microprocessors", Prentice Hall of India
2. Mathur, A.P., "Introduction to Microprocessors", Tata McGraw Hill
3. Rao, P.V.S., "Prospective in Computer Architecture" , Prentice Hall of India

# Bachelor of Computer Applications

Course Code    Course Name  
BCA-S204      Business Economics

L    T    P    C  
3    1    0    4

## UNIT-I

The Scope and Method of Economics, the Economic Problem: Scarcity & Choice, The Price Mechanism, Demand & Supply Equilibrium: The Concept of Elasticity and its Applications.

The Production Process: output decisions – Revenues Costs and Profit Maximisation

Laws of returns & Returns to Scale: Economics and Diseconomies of scale.

## UNIT-II

Market Structure: Equilibrium of a firm and Price, Output Determination under Perfect Competition Monopoly, Monopolistic Competition & Oligopoly

## UNIT-III

Macro Economic Concerns

Inflation, Unemployment, Trade-Cycles, Circular Flow up to Four Sector Economy, Government in the Macro Economy: Fiscal Policy, Monetary Policy, Measuring national Income and Output

## UNIT-IV

The World Economy – WTO, Globalisation, MNC's, Outsourcing, Foreign Capital in India, Trips, Groups of Twenty (G-20), Issues of dumping, Export-Import Policy 2004-2009

## Reference Books:

1. Ahuja H.L., "Business Economics", S.Chand & Co., New Delhi, 2001
2. Ferguson P.R., Rothschild, R and Ferguson G.J."Business Economics" Mac-Milan, Hampshire, 1993
3. Karl E.Case & Ray C. fair , "Principles of Economics" , Pearson Education , Asia, 2000
4. Nellis, Joseph, Parker David, "The Essence of Business Economics", Prentice Hall, New Delhi, 1992.

# Bachelor of Computer Applications

Course Code    Course Name  
BCA-S205      Elements of Statistics

L    T    P    C  
3    1    0    4

## UNIT-I

Population, Sample and Data Condensation

Definition and scope of statistics, concept of population and simple with Illustration, Raw data, attributes and variables, classification, frequency distribution, Cumulative frequency distribution.

## UNIT-II

Measures of Central Tendency

Concept of central Tendency, requirements of good measures of central tendency, Arithmetic mean, Median, Mode, Harmonic Mean, Geometric mean for grouped and ungrouped data.

## UNIT-III

Measures of Dispersion:

Concept of dispersion, Absolute and relative measure of dispersion, range variance, Standard deviation, Coefficient of variation.

## UNIT-IV

Permutations and Combinations

Permutations of 'n' dissimilar objects taken 'r' at a time (with or without repetitions).  $P_r^n = n!/(n-r)!$  (without proof). Combinations of 'r' objects taken from 'n' objects.  $C_r^n = n!/(r!(n-r)!)$  (Without proof) . Simple examples, Applications.

## UNIT-V

Sample space, Events and Probability

Experiments and random experiments, Ideas of deterministic and non-deterministic experiments; Definition of sample space, discrete sample space, events; Types of events, Union and intersections of two or more events, mutually exclusive events, Complementary event, Exhaustive event; Simple examples.

Classical definition of probability, Addition theorem of probability without Proof (up to three events are expected). Definition of conditional probability Definition of independence of two events, simple numerical problems.

## UNIT-VI

Statistical Quality Control

Introduction, control limits, specification limits, tolerance limits, process and product control; Control charts for X and R; Control charts for number of defective {n-p chart} ,control charts for number of defects {c - chart}

## Reference Books:

1. S.C.Gupta - Fundamentals of Statistics - Sultan Chand & sons , Delhi.
2. D.N.Elhance - Fundamentals of statistics - Kitab Mahal, Allahabad.
3. Montgomery D.C. – Statistical Quality Control - John Wiley and Sons
4. Goon, Gupta And Dasgupta - Fundamentals of Statistics - The world press private ltd. , Kolkata.
5. Hogg R.V. and Craig R.G. – Introduction to mathematical statistics Ed 4 {1989} – Macmillan Pub. Co. New York.
6. Gupta S.P. – Statistical Methods, Sultan Chand and Sons New Delhi

# Bachelor of Computer Applications

| Course Code | Course Name                                    | L | T | P | C |
|-------------|--|---|---|---|---|
| BCA-S201P   | Computer Laboratory and Practical Work of OOPS | 0 | 0 | 3 | 2 |

Practical will be based on Paper Object Oriented Programming: Covers UNIT-II, UNIT-III, UNIT-IV, UNIT-V of Syllabus

# Bachelor of Computer Applications

| Course Code | Course Name                                  | L | T | P | C |
|-------------|--|---|---|---|---|
| BCA-S202P   | Computer Laboratory and Practical Work of DS | 0 | 0 | 3 | 2 |

Practical will be based on Paper Data Structure: Covers UNIT-III, UNIT-IV, UNIT-V, UNIT-VI of Syllabus