**CHAUDHARY CHARAN SINGH UNIVERSITY, MEERUT**

**THREE YEARS BACHELOR OF COMPUTER APPLICATION PROGRAMME**

| COURSE CONTENT FOR SEMESTER – III |
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**BCA-301   Object Oriented Programming Using C++**

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| **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 |

**Referential Books:**

1. A.R.Venugopal, Rajkumar, T. Ravishanker "Mastering C++", TMH, 1997.

2. S.B.Lippman & J.Lajoie, " C++ Primer", 3$^{rd}$ 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.

## BCA-302     Data Structure Using C & C++

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| **Unit – I** | Introduction to Data Structure and its Characteristics Array | Representation of single and multidimensional arrays; Sprase 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 |

### Referential Books:

1. E.Horowiz and S.Sahani, " Fundamentals of Data structures", Galgotia Book source Pvt. Ltd.2003

2. R.S.Salaria, " Data Structures & Algorithms" , Khanna Book Pblishing Co. (P) Ltd..,2002

3. Y.Langsam et. Al., " Data Structures using C and C++" , PHI, 1999

## BCA-303  Computer Architecture & Assembly Language

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| **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 memory/ 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, decimal arithmetic operations. |
| **Unit– IV** | Input - Output Organization | Peripheraldevices,Input/outputinterface, 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. |

### Referential 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 Architechture" , Prentice Hall of India

## BCA-304    Business Economics

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| **Unit – I** | The Scope and Method of Economics, the Economic Problem | Scarity & Choice, The Price Mechanism, Demand & Supply Equilibrium: The Concept of Elasticity and it's 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, Monoplastic Competition & Oligopoly |
| **Unit– III** | Macro Economic Concerns | Inflalation, Unemployment, Trade-Cycles, Circular Flow upto 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 |

**Referential Books**:

1. Ahuja H.L., "Business Economics",S.Chand & Co., New Delhi, 2001

2. Ferfuson P.R., Rothchild, R and Fergusen G.J."Business Economics" Mac-
   millan, 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.

## BCA-305     Elements of Statistics

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| **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 a 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). $^{n}P_r$ = n!/(n-r) !(without proof). Combinations of 'r' objects taken from 'n' objects. $^{n}C_r$ = 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. <br><br> Classical definition of probability, Addition theorem of probability without Proof (upto 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} |

### Referential Books:

1. S.C.Gupta - Fundamentals of statistics - Sultan chand & sons , Delhi.
2. D.N.Elhance - Fundamentals of statistics - Kitab Mahal, Allahabad.
3. Montogomery D.C. - Statistical Quality Control - John Welly 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. Newyork.
6. Gupta S.P. - Statistical Methods , Pub - Sultan Chand and sons New Delhi

## Course Code Course Name

### BCA-306P    Computer Laboratory and Practical Work of OOPS
Practical will be based on Paper Object Oriented Programming: Covers UNIT-II, UNIT-III, UNIT-IV, UNIT-V of Syllabus

### BCA-307P    Computer Laboratory and Practical Work of DS
Practical will be based on Paper Data Structure: Covers UNIT-III, UNIT-IV, UNIT-V, UNITVI of Syllabus