C.S.J.M.University,Kanpur.
Bachelors of Computer Application

Course Code	Course Name	L	T	P	C
BCA-3001	Python Programming	3	0	0	3

UNIT-I

Python: Features of Python, Environmental setup, Installation and tools required for running, Basic Types Variable types and operators : Assigning values to variables Multiple Assignments Standard Data Types Set Map Single line comments using Multi-line comments using triple quote, Data Type Conversion Operators, Types of Operator, Conditional statement, Looping statements with else-Pass-Break continue.

UNIT-II

Number and List: Accessing values in List-Delete, update List element-Basic List operations-Indexing, Slicing and Matrices Built in methods and Functions for List-Accessing values in Tuple-Delete, List element-Basic Tuple operations Indexing, Slicing and Matrices Built in methods and Functions for Tuple.

UNIT-III

Dictionary and Function: Accessing values in Dictionary-Updating Dictionary-Deleting Dictionary – elements-Properties of Dictionary keys-Built in Dictionary Functions and Methods Defining Function-Calling function- Pass by reference vs value Function Arguments-Required arguments-Keyword arguments-Default arguments-Variable-length arguments Recursion.

UNIT-IV

Modules and Packages: The Time Module and its functions-Calendar modules and its functions-Other modules and Functions Sum and Difference f time and date Import From import statement From import statement Executing modules, Local functions-Reload function Packages in Python.

UNIT-V

Exception handling: Exception handling and assertions-Standard Exceptions-Assertions in Python-Handling an exception-Except clause with no exception-Except Clause with multiple exception-Try-Finally Clause-Argument of an Exception Raising an Exception.

Referential Books:

1. Tony Gaddis, Starting Out with Python, 3rd edition, Pearson
2. Y. Daniel Liang, Introduction to Programming Using Python, Pearson
3. Budd T A, Exploring Python , 2011, Tata McGraw Hill Education
4. Learning Python, Fourth Edition, Mark Lutz, O'Reilly publication

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Course Code	Course Name	L	T	P	C
BCA-3002	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; 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

Graphs: Graph terminology, Representation of graphs, path matrix, BFS (breadth first search), DFS (depth first search), topological sorting, Warshall's algorithm (shortest path algorithm.)

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

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Course Code	Course Name	L	T	P	C
BCA-3003	Operating System	3	1	0	4

UNIT-I

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

Memory Management: Background, Logical versus physical Address space, swapping, Contiguous allocation, Paging, Segmentation

Virtual Memory: Demand Paging, Page Replacement, Page- replacement Algorithms, Performance of Demand Paging, Allocation of Frames, Thrashing, Other Considerations

UNIT-II

Processes: Process Concept, Process Scheduling, Operation on Processes

CPU Scheduling: Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Multiple – Processor Scheduling.

UNIT-III

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

UNIT-IV

Device Management: Techniques for Device Management, Dedicated Devices, Shared Devices, Virtual Devices; Input or Output Devices, Storage Devices, Buffering.

UNIT-V

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, Directory Structure, Protection.

Referential Books:

1. Silbersachatz and Galvin, " Operating System Concepts", Person, 5th Ed.2001
2. Madnick E., Donovan J., " Operating Systems:,Tata McGrawHill,2001
3. Tannenbaum, "Operating Systems", PHI, 4th Edition,2000

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Course Code	Course Name	L	T	P	C
BCA-3004	Digital Electronics & Computer Organization	3	1	0	4

UNIT-I

Number System & Boolean Algebra Number System: Binary, Octal, Decimal, Hexadecimal; Conversion of Number System; Binary Arithmetic & Complement, Binary Codes: Weighted & Non Weighted, Gray Code, Excess-3 Code. 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; Implementations of Logic Functions using Gates; NAND- NOR Implementations; Multilevel gate Implementations.

UNIT-II

Combinational Circuits Adders & Subtractors: Half Adder, Full Adder, Binary Adder, Half Subtractor, Full Subtractor, Adder Subtractor; Magnitude Comparator: Two Bit Magnitude Comparator, Three Bit Magnitude Comparator; Multiplexer & De-Multiplexer: 4*1 Multiplexer, 8*1 Multiplexer; Decoder & Encoder; Parity Checker & Generator; Code Converter.

UNIT-III

Sequential Circuit: Introduction to Flip Flops: SR, JK, T, D, Master Slave Flip Flops; Conversion of Flip Flops; Characteristic Table & Equation; Edge Triggering & Level Triggering; Excitation Table; State Diagram; State Table; State Reduction; Design of Sequential Circuits.

UNIT-IV

Registers Introduction of Registers; Classification of Registers; Register with Parallel Load; Shift Registers; Bidirectional Shift Register with Parallel Load. Counters Introduction of Counter; Asynchronous/Ripple Counters; Synchronous Counters; BCD Counter; 4-bit Binary Counter with Parallel Load; Design of Synchronous Counters; Ring Counter; Johnson Counter.

UNIT-V Memory Organization:

Basic cell of static and dynamic RAM; Building large memories using chips; Associative memory; Cache memory organization and Virtual memory organization.

Referential Books:

1. Digital Logic and Computer design (PHI) 1998 : M.M. Mano
2. Computer Architecture (PHI) 1998 : M.M. Mano
3. Digital Electronics (TMH) 1998 : Malvino and Leach
4. Computer Organization and Architecture : William Stallings
5. Digital fundamentals (Universal Book Stall) 1998 : Floyd, L.Thomas
6. Computer Organization (MC Graw-Hill, Signapore) : Hamcher, Vranesic and Zaky

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Course Code	Course Name	L	T	P	C
BCA-3005	Elements of Statistics	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 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.

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:

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

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Course Code	Course Name	L	T	P	C
BCA-3001P	**Computer Laboratory and Practical Work of Python**	**0**	**0**	**3**	**2**

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

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Course Code	Course Name	L	T	P	C
BCA-3002P	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 of Syllabus