BCA (2022-23) Syllabus semester wise with Marks Break-up

Semester	Paper Code	Paper Name	External Marks	Internal Marks	Total Marks	L	T	P	Credits
Semester - I	BCA101 T	Programming Principles Using Python	75	25	100	3			3
	BCA102 T	Computer System Architecture	75	25	100	3			3
	BCA103	Introduction to Innovation and Entrepreneurship	75	25	100	3	1		4
	BCA104	Business Communication	75	25	100	3	1		4
	BCA105	Foundation of Mathematics for Computer Applications	75	25	100	3	1		4
	BCA101 P	Practical Lab for Programming Principles Using Python			50			3	2
	BCA102 P	Practical Lab for Computer System Architecture			50			3	2
					600				22

Semester	Paper Code	Paper Name	External Marks	Internal Marks	Total Marks	L	T	P	Credits
Semester - II	BCA201 T	Object Oriented Programming Using C++	75	25	100	3			3
	BCA202 T	Concepts of Data Structure	75	25	100	3			3
	BCA203	Management Information System	75	25	100	3	1		4
	BCA204	Introduction to Soft Computing	75	25	100	3	1		4
	BCA205	Discrete Mathematics	75	25	100	3	1		4
	BCA201 P	Practical Lab for Object Oriented Programming Using C++			50			3	2
	BCA202 P	Practical Lab for Data Structure			50			3	2
					600				22

Semester	Paper Code	Paper Name	External Marks	Internal Marks	Total Marks	L	T	P	Credits
Semester - III	BCA301 T	JAVA Programming and Dynamic Web Design	75	25	100	3			3
	BCA302 T	Operating System	75	25	100	3			3
	BCA303	Computer Network	75	25	100	3	1		4
	BCA304	Android Programming	75	25	100	3	1		4
	BCA305	Elements of Statistics	75	25	100	3	1		4
	BCA301 P	Practical Lab for Java Programming			50			3	2
	BCA302 P	Practical Lab for Operating System			50			3	2
					600				22

Semester	Paper Code	Paper Name	External Marks	Internal Marks	Total Marks	L	T	P	Credits
Semester - IV	BCA401 T	Introduction to DBMS	75	25	100	3			3
	BCA402 T	Design and Analysis of Algorithm	75	25	100	3			3
	BCA403	Software Engineering	75	25	100	3	1		4
	BCA404	Introduction to Cloud Computing	75	25	100	3	1		4
	BCA405	Numerical Methods	75	25	100	3	1		4
	BCA401 P	Practical Lab for DBMS			50			3	2
	BCA402 P	Practical Lab for DAA			50			3	2
					600				22

Semester	Paper Code	Paper Name	External Marks	Internal Marks	Total Marks	L	T	P	Credits
Semester - V	**BCA501 T**	Computer Graphics & Animation	75	25	100	3			3
	BCA502 T	Web & Internet Technologies	75	25	100	3			3
	BCA503	Data Mining	75	25	100	3	1		4
	BCA504	Information Security	75	25	100	3	1		4
	BCA505	Minor Project			50		1	2	2
	BCA506	Viva-Voice on Minor Project			50			2	1
	BCA501 P	Practical Lab for Computer Graphics & Animation			50			3	2
	BCA502 P	Practical Lab for Web & Internet Technologies			50			3	2
					600				**21**

Semester	Paper Code	Paper Name	External Marks	Internal Marks	Total Marks	L	T	P	Credits
Semester - VI	**BCA601**	Theory of Computation	75	25	100	4			4
	BCA602	Artificial Intelligence	75	25	100	3	1		4
	BCA603	Machine Learning	75	25	100	3	1		4
	BCA604	Digital Image Processing	75	25	100	3	1		4
	BCA605	Major Project			150		3	6	5
	BCA606	Presentation/Se minar based on Major Project			50				1
					600				**22**

Bachelors of Computer Application

Course Code	Course Name	L	T	P	C
BCA101 T	Programming Principles Using Python	3			3

Unit-I

Computer Fundamentals and Problem Solving: Basic Computer Organization: CPU, memory, I/O Units. Problem Solving using Computation, notion of an algorithm.

Unit-II

Introduction to Python Programming: Python interpreter/Python shell, indentation; identifiers and keywords; literals, numbers and strings; operators (Arithmetic, Relational, Boolean, Assignment, Ternary and Bitwise) and expressions.

Unit-III

Creating Python Programs: Input and output statements, control statements (conditional statements, loop control statements, break, continue and pass, exit), defining functions, default arguments, errors and handling exceptions.

Unit-IV

Strings and Lists: String class, built-in functions for string, string traversal, string operators and operations; Lists creation, traversal, slicing and splitting operations, passing list to a function

Unit-V

Object Oriented Programming: Introduction to Object, Class and Method, Standard Libraries, File handling through libraries.

Unit-VI

Built-in data structures: Tuples, Sets, Dictionary, Stacks, and Queues; Sorting and Searching.

Text Books:

1. Downey, A.B., (2015), Think Python–How to think like a Computer Scientist, 3rd edition. O'Reilly Media.
2. Guttag, J.V.(2016), Introduction to computation and programming using Python. MIT Press.
3. Liang, Y.D. (2013), Introduction to programming using Python. Pearson Education.
4. Brown, M. C. (2001). The Complete Reference: Python, McGraw Hill Education.

Course Code	Course Name	L	T	P	C
BCA102 T	**Computer System Architecture**	**3**			**3**

Unit-I

Introduction: Logic gates, boolean algebra, combinational circuits, circuit simplification, flip-flops and sequential circuits, decoders, multiplexers, registers, counters and memory units.

Unit-II

Data Representation and Basic Computer Arithmetic: Number systems, complements, fixed and floating point representation, character representation, addition, subtraction, magnitude comparison, multiplication and division algorithms for integers

Unit-III

Basic Computer Organization and Design: Computer registers, bus system, instruction set, timing and control, instruction cycle, memory reference, input-output and interrupt, Interconnection Structures, Bus Interconnection design of basic computer.

Unit-IV

Central Processing Unit: Register organization, arithmetic and logical micro-operations, stack organization, micro programmed control. Instruction formats, addressing modes, instruction codes, machine language, assembly language, input output programming, RISC, CISC architectures, pipelining and parallel architecture.

Unit-V

Memory Organization: Cache memory, Associative memory, mapping.

Unit-VI

Input-Output Organization: Input / Output: External Devices, I/O Modules, Programmed I/O, Interrupt-Driven I/O, Direct Memory Access, I/O Channels.

Text Books:

1. M. Mano, Computer System Architecture, Pearson Education 1992
2. Digital Design, M.M. Mano, Pearson Education Asia, 2015
3. W. Stallings, Computer Organization and Architecture Designing for Performance, 8th Edition, Prentice Hall of India, 2009

Bachelors of Computer Application

Course Code	Course Name	L	T	P	C
BCA103	Introduction to Innovation and Entrepreneurship	3	1		4

Unit-I

Introduction to Entrepreneurship: Entrepreneurs; entrepreneurial personality and intentions - characteristics, traits and behavioral; entrepreneurial challenges.

Unit-II

Entrepreneurial Opportunities: Opportunities. discovery/ creation, Pattern identification and recognition for venture creation: prototype and exemplar model, reverse engineering.

Unit-III

Entrepreneurial Process and Decision Making: Entrepreneurial ecosystem, Ideation, development and exploitation of opportunities; Negotiation, decision making process and approaches, Effectuation and Causation.

Unit-IV

Crafting business models and Lean Start-ups: Introduction to business models; Creating value propositions-conventional industry logic, value innovation logic; customer focused innovation; building and analyzing business models; Business model canvas, Introduction to lean startups, Business Pitching.

Unit-V

Organizing Business and Entrepreneurial Finance: Forms of business organizations; organizational structures; Evolution of Organisation, sources and selection of venture finance options and its managerial implications. Policy Initiatives and focus; role of institutions in promoting entrepreneurship.

Text Books:

1. Ries, Eric(2011), The lean Start-up: How constant innovation creates radically successful businesses, Penguin Books Limited.
2. Bagchi, Subroto, (2008), Go Kiss the World: Life Lessons for the Young Professional, Portfolio Penguin
3. Verstraete, T. and Laffitte, E.J. (2011). a Business Model of Entrepreneurship, Edward Elgar Publishing
4. Innovation and Entrepreneurship – by Peter Drucker, Harper Collins

Bachelors of Computer Application

Course Code	Course Name	L	T	P	C
BCA104	Business Communication	3	1		4

UNIT-I
Means of Communication:
Meaning and Definition – Process – Functions – Objectives – Importance – Essentials of good communication – Communication barriers, 7C's of Communication

UNIT-II
Types of Communication:
Oral Communication:
Meaning, nature and scope – 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 dramatization – Public address system – Grapevine – Group Discussion – Oral report – Closed circuit TV). The art of listening – Principles of good listening.

UNIT-III
Written Communication
Purpose of writing, Clarity in Writing, Pricinciple of Effective writing, Writing Techniques, Electronic Writing Process.

UNIT-IV
Business Letters & Reports:
Need and functions of business letters – Planning & layout of business letter – Kinds of business letters – Essentials of effective correspondence, Purpose, Kind and Objective of Reports, Writing Reports.

UNIT-V
Drafting of business letters:
Enquiries and replies – Placing and fulfilling orders – Complaints and follow-up Sales letters – Circular letters Application for employment and resume

UNIT-VI
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.
Topics Prescribed for workshop/skill lab
Group Discussion, Mock Interview, Decision Making in a Group

Referential Books :
1) Business Communication – K.K.Sinha – Galgotia Publishing Company, New Delhi.
2) Media and Communication Management – C.S. Rayudu – Hikalaya Publishing House, Bombay.
3) Essentials of Business Communication – Rajendra Pal and J.S. Korlhalli- Sultan Chand & Sons, New Delhi.
4) Business Communication (Principles, Methods and Techniques) Nirmal Singh -Deep &Deep Publications , New Delhi.
5) Business Communication – Dr.S.V.Kadvekar, Rawal and Kothavade- Diamond Publications, Pune.
6) Business Correspondence and Report Writing – R.C. Sharma, Krishna Mohan – TMH , New Delhi.
7) Modern Business Correspondence – L. Gartside – The English Language Book Society and Macdonald and Evans Ltd.
8) Business Communication – M. Balasubrahmanyan –Vani Education Books.

Bachelors of Computer Application

Course Code	Course Name	L	T	P	C
BCA105	**Mathematical Foundation for Computer Applications**	3	1		4

Unit-I

Basic concepts of set theory: Mathematical logic-introduction, statements, connectives, negation, conjunction, disjunction, statement formulas and truth tables, conditional and bi-conditional statements, tautology, contradiction, equivalence of formulas, duality law-Predicates and Quantifiers, Arguments.

Unit-II

Operations on sets: power set- venn diagram Cartesian product-relations -functions- types of functions - composition of functions.

Unit-III

Matrix algebra: Types of matrices, matrix operations, transpose of a matrix, determinant of matrix, inverse of a matrix, Cramer's rule

Unit-IV

Matrix: Rank of a matrix, normal form, echelon form, Cayley-Hamilton theorem, Eigen values, Eigen Vectors

Unit-V

Differential calculus: Functions and limits, Simple Differentiation of Algebraic Functions, Evaluation of First and Second Order Derivatives, Maxima and Minima

Unit-VI

Integral Calculus: Integral as Limit of Sum, Fundamental Theorem of Calculus(without proof.), Indefinite Integrals, Methods of Integration Substitution, By Parts, Partial Fractions, Reduction Formulae for Trigonometric Functions, Gamma and Beta Functions(definition).

Text 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. Shanti Narayan, "Differential Caluculs", S.Chand & Company, 1998.

Bachelors of Computer Application

Course Code	Course Name	L	T	P	C
BCA101 P	Programming Principles Using Python			3	2

Practical will be based on the Paper Programming Principles Using Python. On whole Syllabus.

Bachelors of Computer Application

Course Code	Course Name	L	T	P	C
BCA102 P	Computer System Architecture			3	2

Practical will be based on the Paper Computer System Architecture. On whole Syllabus.

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Course Code	Course Name	L	T	P	C
BCA201 T	Object Oriented Programming Using C++	3			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 idendity 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, Parameteric 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", 3rd Edition, Addison Wesley, 2000.
3. R. Lafore, "Object Oriented Programming using C++", Galgotia Publications, 2004
4. D. Parasons, "Object Oriented Programming using C++", BPB Publication.

Bachelors of Computer Application

Course Code	Course Name	L	T	P	C
BCA202 T	Concepts of Data Structures	3			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
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

Bachelors of Computer Application

Course Code	Course Name	L	T	P	C
BCA203	Management Information System	3	1		4

Unit – I

Management Information System(MIS): Concept & definition, Role of MIS, Process of Management, MIS-A tool for management process, Impact of MIS, MIS & computers, MIS & the user, IMS- a support to the Management.

Unit – II

Planning & Decision making: The concept of corporate planning, Strategic planning Type of strategic, Tools of Planning, MIS-Business Planning; Decision making concepts, Methods, tools and procedures, Organizational Decision making, MIS & Decision making concepts.

Unit – III

Information &System: Information concepts, Information: A quality product classification of the information, Methods of data & information collection, Value of information, MIS &System concept, MIS & System analysis ,Computer System Design.

Unit – IV

Development of MIS: Development of long rage plans of the MIS. Ascertaining the class of information, determining the Information requirement, Development and implementation of the MIS, Management of quality in the MIS, organization for development of the MIS, MIS: the factors of success and failure.

Unit – V

Decision Support System (DSS): Concept and Philosophy, DSS: Deterministic Systems, Artificial intelligence(AI) System, Knowledge based expert system(KBES), MIS & the role of DSS, Transaction Processing System(TPS), Enterprise Management System(EMS), Enterprise Resource Planning (ERP) System, Benefits of ERP, EMS & ERP

Text Books:

1. Management Information System, Jawadekar, W. S.
2. Managing with information, Kanter, Jerome
3. Management Information System, Louden & Louden
4. Information system for Modern Management, Murdick & Ross, R.claggett

Bachelors of Computer Application

Course Code	Course Name	L	T	P	C
BCA204	Introduction to Soft Computing	3	1		4

Unit-I

(Introduction) Basic concepts of fuzzy logic, Fuzzy sets and Crisp sets, Fuzzy set theory and operations, Properties of fuzzy sets, Fuzzy and Crisp relations, Fuzzy to Crisp conversion.

Unit-II

(Fuzzy Membership, Rules) Membership functions, interference in Fuzzy Logic, Fuzzy if-then rules, Fuzzy implications and Fuzzy algorithms, Fuzzification & De-Fuzzification, Fuzzy Controller, Industrial applications.

Unit-III

Genetic Algorithm(GA) Basic concepts, Working principle, Procedures of GA, Flow chart of GA, Genetic representations, (encoding) Initialization and selection, Genetic operators, Mutation, Generational Cycle, Applications.

Unit-IV (Introduction & Architecture) Neuron, Nerve structure and synapse, Artificial Neuron and its model, activation functions.

Unit-V

Neural network architecture: Single layer and Multilayer feed forward networks, Recurrent networks, Learning techniques, Perception and Convergence rule, Auto-associative and hetero-associative memory.

Unit-VI

(Back propagation networks) Architecture: perceptron model, solution, single layer artificial neural network, Multilayer perceptron model; back propagation learning methods, effect of learning rule co-efficient; back-propagation algorithm, factors affecting back-propagation training, applications.

Text Books:

1. S. Rajsekaran & G.A. Vijayalakshmi Pai, "Neural Networks, Fuzzy Logic and Genetic Algorithm: Synthesis and Applications" Prentice Hall of India.
2. N. P. Padhy, "Artificial Intelligence and Intelligent Systems" Oxford University Press.
3. Simon Haykin, "Neural Networks" Prentice Hall of India
4. Timothy J. Ross, "Fuzzy Logic with Engineering Applications" Wiley India.
5. Kumar Satish, "Neural Networks" Tata McGraw Hill

Bachelors of Computer Application

Course Code	Course Name	L	T	P	C
BCA205	Discrete Mathematics	3	1		4

Unit – I
Set Relation And Function : Sets & subsets, set operation, power set, Cartesian product of two sets composition of relation, type of relation, mapping, mathematical function, exponential & logarithmic functions.
Group & fields: Group, sub group, Finite & infinite group, cyclic group, permutation group, homomorphism, isomorphism, automorphism, endomorphism, coset, Field, sub field & Ring.

Unit – II
Mathematical Logic: Statement & Notations, connectives, Normal forms, Theory of inference for the statement calculus, Predicate calculus.

Unit – III
Basic concept of Graph: Basics of Graph, Pseudograph, Multigraph, Simple graph, Bipartite graph and Complete Bipartite graph, Hand Shaking Lemma, Sub graphs, Operations on graph, Walk, Path and Circuits and their properties. Shortest Path Problem.

Unit - IV
Eulerian and Hamiltonian Graph: Unicursal and Eulerian graph, Randomly Eulerian graph, Fleury's Algorithm, Chinese Postman Problem, Hamiltonian Graph, Necessary and Sufficient conditions, Traveling Salesman Problem.

Unit – V
Trees and Spanning Trees: Tree, Properties of tree, Distance, Radius, Diameter of a tree, Spanning tree, Fundamental Circuit, Cayley's Formula for number of spanning tree, Minimal spanning tree : Kruskal's and Prim's Algorithm, Connectivity and Separability**.**

Unit-VI
Network Flow:
Networks: Flows, Cuts in a Network, Max-flow Min-cut theory, Augmenting path, Ford and Fulkerson algorithm, Edonds and Karp algorithm, Menger's Theorems.

Text Books:
1. C.L. Liu & Mahopatra, Elements of Discrete mathematics, 2nd Sub Edition 1985, Tata McGraw Hill
2. Rosen, Discrete Mathematics and Its Applications, Sixth Edition 2006
3. J. L. Hein, Discrete Structures, Logic, and Computability, Jones and Bartlett Publishers, 3rd Edition, 2009

Bachelors of Computer Application

Course Code	Course Name	L	T	P	C
BCA201 P	Practical Lab for Object Oriented Programming Using C++			3	2

Practical will be based on the Paper Object Oriented Programming Using C++. On whole Syllabus.

Bachelors of Computer Application

Course Code	Course Name	L	T	P	C
BCA202 P	Practical Lab for Data Structure			3	2

Practical will be based on the Paper Concepts of Data Structure. On whole Syllabus.