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University, Ayodhya-224001, UP, India.

Faculty of Commerce and Management
Syllabus for BCA
(Regulations in accordance with National Education Policy to be implemented from Academic Year (2024-25)

(Subject to the modifications that will be made from time to time)

7/3/24 07.03.2024 7/3/24

BCA (2024-25) NEP Syllabus

1st Year

Sem.	Subject	Paper Code	Paper Name	L	T	P	Credits	(Cumulative Minimum Credits) Required for Awards of Certificate /Diploma/Degree
I	Major 01	BCA101 T	Programming Principles Using Python	4			3	(46 Credits) Certificate in Computer Application
	Major 02	BCA102 T	Computer System Architecture	4			3	
	Major 03	BCA103	Foundation of Mathematics for Computer Applications	3	1		4	
	Minor 1	BCA108	Programming Principles Using Python (for other Department's students) BCA Students may opt the Generic/Interdisciplinary Elective Course from the list of courses offered by other Departments/ Subjects.	4			4	
	Vocational 1		Within Faculty/other department				3	
	AECC 1		Food, Nutrition and Hygiene	3	1		2	
		BCA101 P	Practical Lab for Programming Principles Using Python			4	2	
		BCA102 P	Practical Lab for Computer System Architecture			4	2	
							23	

Sem.	Subject	Paper Code	Paper Name	L	T	P	Credits
II	Major 04	BCA201 T	Object Oriented Programming Using C++	4			3
	Major 05	BCA202 T	Concepts of Data Structure	4			3
	Major 06	BCA203	Discrete Mathematics	3	1		4
	Minor 2	BCA208	Data Analysis and Visualization using Python (for other Department's students) BCA Students may opt the Generic/Interdisciplinary Elective Course from the list of courses offered by other Departments / Subjects.	4			4
	Vocational 2		Within Faculty/other department				3
		AECC 2	First Aid and Health	3	1		2
		BCA201 P	Practical Lab for Object Oriented Programming Using C++			4	2
		BCA202 P	Practical Lab for Data Structure			4	2
							23

BCA 1st Year

BCA (2024-25) Syllabus semester wise with Marks Break-up											
Sem	Subject	Paper Code	Paper Name	External Marks	Interal Marks	Total Marks	L	T	P	Credit	(Cumulative Minimum Credits) Required for Awards of Certificate /Diploma/Degree
I	Major 01	BCA101 T	Programming Principles Using Python	75	25	100	4			3	
	Major 02	BCA102 T	Computer System Architecture	75	25	100	4			3	
	Major 03	BCA103	Foundation of Mathematics for Computer Applications	75	25	100	3	1		4	
	Minor 1	BCA108	Minor 1	75	25	100	4			4	
	Vocational 1		Vocational 1			100				3	
	CC 1		Food, Nutrition and Hygiene	75	25	100	3	1		2	
		BCA101 P	Practical Lab for Programming Principles Using Python			50			4	2	
		BCA102 P	Practical Lab for Computer System Architecture			50			4	2	
	Total					700				23	(46 Credits) Certificate in Computer Application

	Subject	Paper Code	Paper Name	External Marks	Internal Marks	Total Marks	L	T	P	Credits
II	Major 04	BCA201 T	Object Oriented Programming Using C++	75	25	100	4			3
	Major 05	BCA202 T	Concepts of Data Structure	75	25	100	4			3
	Major 06	BCA203	Discrete Mathematics	75	25	100	3	1		4
	Minor 2	BCA208	Minor 2	75	25	100	4			4
	Vocational 2		Vocational 2			100				3
	CC 2		First Aid and Health	75	25	100	3	1		2
		BCA201 P	Practical Lab for Object Oriented Programming Using C++			50			4	2
		BCA202 P	Practical Lab for Data Structure			50			4	2
	Total					700				23

BCA (2024-25) NEP Syllabus

1st Year

Sem.	Subject	Paper Code	Paper Name	L	T	P	Credits	(Cumulative Minimum Credits) Required for Awards of Certificate /Diploma/Degree
I	Major 01	BCA101 T	Programming Principles Using Python	4			3	(46 Credits) Certificate in Computer Application
	Major 02	BCA102 T	Computer System Architecture	4			3	
	Major 03	BCA103	Foundation of Mathematics for Computer Applications	3	1		4	
	Minor 1	BCA108	Programming Principles Using Python (for other Department's students) BCA Students may opt the Generic/Interdisciplinary Elective Course from the list of courses offered by other Departments/ Subjects.	4			4	
	Vocational 1		Within Faculty/other department				3	
	AECC 1		Food, Nutrition and Hygiene	3	1		2	
		BCA101 P	Practical Lab for Programming Principles Using Python			4	2	
		BCA102 P	Practical Lab for Computer System Architecture			4	2	
							23	

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	Major 05	BCA202 T	Concepts of Data Structure	4			3
	Major 06	BCA203	Discrete Mathematics	3	1		4
	Minor 2	BCA208	Data Analysis and Visualization using Python (for other Department's students) BCA Students may opt the Generic/Interdisciplinary Elective Course from the list of courses offered by other Departments / Subjects.	4			4
	Vocational 2		Within Faculty/other department				3
		AECC 2	First Aid and Health	3	1		2
		BCA201 P	Practical Lab for Object Oriented Programming Using C++			4	2
		BCA202 P	Practical Lab for Data Structure			4	2
							23

BCA I Semester

Course Code	Course Name	L	T	P	Credit
BCA102 T	Computer System Architecture	4			3

Unit-I

Data Representation and Basic Computer Arithmetic: Number systems, complements, fixed and floating-point representation, addition, subtraction, magnitude comparison, multiplication and division algorithms for integers, Logic gates, Boolean algebra, combinational circuits, circuit simplification, flip-flops and sequential circuits, decoders, multiplexers, registers, counters.

Unit-II

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-III

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-IV

Memory Organization: Cache memory, Associative memory, mapping.

Unit V

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.

BCA I Semester

Course Code	Course Name	L	T	P	Credit
BCA103	Foundation of Mathematics for Computer Applications	3	1		4

Unit-I

Basic concepts of set theory, Operations on sets: power set, Venn diagram Cartesian product, relations, functions, types of functions, composition of functions.

Unit-II

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-III Matrix algebra: Types of matrices, matrix operations, transpose of a matrix, determinant of matrix, inverse of a matrix, Cramer's rule, Matrix: Rank of a matrix, normal form, echelon form, Cayley-Hamilton theorem, Eigen values, Eigen Vectors.

Unit-IV

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

Unit V

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 Mathematicsl, 34th Ed., 1998.
2. Shanti Narayan, —Integral Calculusl, S. Chand & Company, 1999
3. H.K. Dass, —Advanced Engineering Mathematicsl, S. Chand & Company, 9th Revised Edition, 2001.
4. Shanti Narayan, —Differential Calculusl, S. Chand & Company, 1998.

BCA I Semester

Course Code	Course Name	L	T	P	Credit
BCA108	Introduction to Innovation and Entrepreneurship	4			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

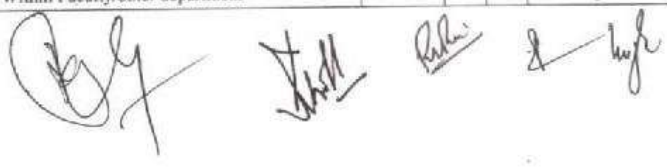
Organizing Business and Entrepreneurial Finance: Forms of business organizations; organizational structures; Evolution of Organisation, sources and selection of venture finance options and its managerial implications. Policy Initiatives and focus; role of institutions in promoting entrepreneurship.

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

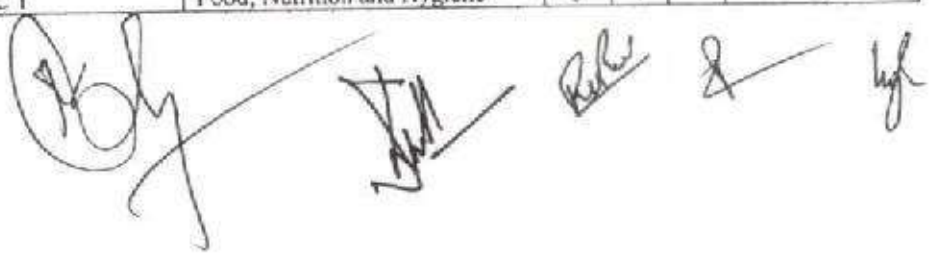
BCA I Semester

Course Code/Course Name	Course Name	L	T	P	Credit
Vocational 1	Within Faculty/other department				3



BCA I Semester

Course Code/Course Name	Course Name	L	T	P	Credit
AECC I	Food, Nutrition and Hygiene	3	1		2



BCA I Semester

Course Code/Course Name	Course Name	L	T	P	Credit
BCA101 P	Practical Lab for Programming Principles Using Python			4	2

Internal/External Examiners for Practical Exams will be appointed by University on the recommendation of Board of Studies.

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

BCA I Semester

Course Code/Course Name	Course Name	L	T	P	Credit
BCA102 P	Practical Lab for Computer System Architecture			4	2

Internal/External Examiners for Practical Exams will be appointed by the University on the recommendation of Board of Studies.

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

BCA II Semester

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

BCA II Semester

Course Code/Course Name	Course Name	L	T	P	Credit
BCA202 T	Concepts of Data Structure	4			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, 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 & Algorithmsl , Khanna Book Pblishing Co. (P) Ltd..,2002.
3. Y. Langsam et. Al., — Data Structures using C and C++, PHI, 1999.

BCA II Semester

Course Code/Course Name	Course Name	L	T	P	Credit
BCA203	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.

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

BCA II Semester

Course Code/Course Name	Course Name	L	T	P	Credit
BCA208	Business Communication	4			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.

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

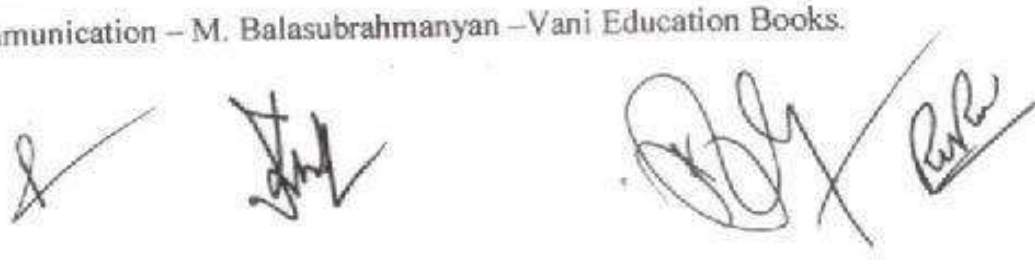
UNIT-V

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. 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. 8) Business Communication – M. Balasubrahmanyan –Vani Education Books.

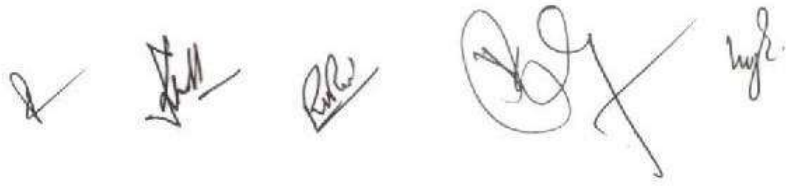


BCA II Semester

Course Code/Course Name	Course Name	L	T	P	Credit
Vocational 2	Within Faculty/other department				3

BCA II Semester

Course Code/Course Name	Course Name	L	T	P	Credit
AECC 2	First Aid and Health	3	1		2



BCA II Semester

Course Code/Course Name	Course Name	L	T	P	Credit
BCA201 P	Practical Lab for Object Oriented Programming Using C++			4	2

Internal/External Examiners for Practical Exams will be appointed by the University on the recommendation of Board of Studies.

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

BCA II Semester

Course Code/Course Name	Course Name	L	T	P	Credit
BCA202 P	Practical Lab for Data Structure			4	2

Internal/External Examiners for Practical Exams will be appointed by the university on the recommendation of Board of studies.

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