

Unified Syllabus by
Department of Computer Science, University of Lucknow
Bachelors of Computer Application
Semester-wise breakup of course

Semester-Ist

Course Code	Course Name	L	T	P	C
BCA-S101T	Computer Fundamental & Office Automation	3	0	0	3
BCA-S102T	Programming Principle & Algorithm	3	0	0	3
BCA-S103T	Principle of Management	4	0	0	4
BCA-S104T	Business Communication	3	1	0	4
BCA-S105T	Mathematics –I	4	0	0	4
BCA-S101P	Computer Laboratory and Practical Work of Office	0	0	3	2
	Computer Laboratory and Practical Work of Programming Principle & Algorithm	0	0	3	2
					22

Semester-IInd

Course Code	Course Name	L	T	P	C
BCA-S106T	C Programming	3	0	0	3
BCA-S107	Digital Electronics & Computer Organization	3	1	0	4
BCA-S108	MIS (Management Information system)	4	0	0	4
BCA-S109	Financial Accounting & Management	3	1	0	4
BCA-S110	Mathematics II	4	0	0	4
BCA-S106P	Computer Laboratory and Practical Work of C Programming	0	0	6	3
					22

=

Unified Syllabus by
Department of Computer Science, University of Lucknow
Bachelors of Computer Application
Semester-wise breakup of course

Semester-IIIrd

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

Semester-IVth

Course Code	Course Name	L	T	P	C
BCA-S206T	Computer Graphics & Multimedia Application	3	0	0	3
BCA-S207	Operating System	3	1	0	4
BCA-S208	Software Engineering	3	1	0	4
BCA-S209	Optimization Techniques	3	1	0	4
BCA-S210	Graph Theory	4	0	0	4
BCA-S206P	Computer Laboratory and Practical Work of Computer Graphics & Multimedia Application	0	0	6	3
					22

Unified Syllabus by

Department of Computer Science, University of Lucknow

Bachelors of Computer Application

Semester-wise breakup of course

Semester-Vth

Course Code	Course Name	L	T	P	C
BCA-S301T	Introduction to DBMS	3	0	0	3
BCA-S302T	Java Programming and Dynamic We page Design	3	0	0	3
BCA-S303	Data communication & Computer Network	3	1	0	4
BCA-S304	Numerical Methods	3	1	0	4
BCA-S305	Minor Project	0	1	2	2
BCA-S306	Viva-Voice on Summer Training	0	0	2	1
BCA-S301P	Computer Laboratory and Practical W ork of DBMS	0	0	3	2
	Computer Laboratory and Practical W ork of Java Programming & Dynamic Webpage Design	0	0	3	2
					21

Semester-VIth

Course Code	Course Name	L	T	P	C
BCA-S307	Computer Network Security and Management	4	0	0	4
BCA-S308	Information System: Analysis Design & Implementation	3	1	0	4
BCA-S309	E-Commerce	4	0	0	4
BCA-S310	Knowledge Management	3	1	0	4
BCA-S311	Major Project	0	3	6	5
BCA-S312	Presentation/Seminar based on Major Project				1
					22

Unified Syllabus by

Department of Computer Science, University of Lucknow

Bachelors of Computer Application

Semester-wise breakup of course

Semester-Ist

Code	Course Name	Total	L	T	P	C
BCA-S101T	Computer Fundamental & Office Automation	100	3	0	0	3
BCA-S102T	Programming Principle & Algorithm	100	3	0	0	3
BCA-S103	Principle of Management	100	4	0	0	4
BCA-S104	Business Communication	100	3	1	0	4
BCA-S105	Mathematics -I	100	4	0	0	4
BCA-S101P	Computer Laboratory and Practical Work of Office Automation	100	0	0	3	2
	Computer Laboratory and Practical Work of Programming Principle & Algorithm		0	0	3	2
		600	22			

Semester-IInd

Code	Course Name	Total	L	T	P	C
BCA-S106T	C Programming	100	3	0	0	3
BCA-S107	Digital Electronics & Computer Organization	100	3	1	0	4
BCA-S108	MIS (Management Information System)	100	4	0	0	4
BCA-S109	Financial Accounting & Management	100	3	1	0	4
BCA-S110	Mathematics II	100	4	0	0	4
BCA-S106P	Computer Laboratory and Practical Work of C Programming	100	0	0	6	3
		600	22			

Unified Syllabus by

Department of Computer Science, University of Lucknow

Bachelors of Computer Application

Semester-wise breakup of course

Semester-IIIrd

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

Semester-IVth

Code	Course Name	Total	L	T	P	C
BCA-S206T	Computer Graphics & Multimedia Application	100	3	0	0	3
BCA-S207	Operating System	100	3	1	0	4
BCA-S208	Software Engineering	100	3	1	0	4
BCA-S209	Optimization Techniques	100	3	1	0	4
BCA-S210	Graph Theory	100	4	0	0	4
BCA-S206P	Computer Laboratory and Practical Work of Computer Graphics & Multimedia Application	100	0	0	6	3
		600	22			

Unified Syllabus by

Department of Computer Science, University of Lucknow

Bachelors of Computer Application

Semester-wise breakup of course

Semester-Vth

Code	Course Name	Total	L	T	P	C
BCA-S301T	Introduction to DBMS	100	3	0	0	3
BCA-S302T	Java Programming and Dynamic Webpage Design	100	3	0	0	3
BCA-S303	Data Communication & Computer Network	100	3	1	0	4
BCA-S304	Numerical Methods	100	3	1	0	4
BCA-S305	Minor Project	50	3	1	2	2
BCA-S306	Viva-Voice on Summer Training	50	0	0	2	1
BCA-S301P	Computer Laboratory and Practical Work of DBMS	100	0	0	3	2
	Computer Laboratory and Practical Work of Java Programming & Dynamic Webpage Design		0	0	3	2
		600	21			

Semester-VIth

Code	Course Name	Total	L	T	P	C
BCA-S307	Network Security and Management	100	4	0	0	4
BCA-S308	Information System: Analysis Design & Implementation	100	3	1	0	4
BCA-S309	E-Commerce	100	4	0	0	4
BCA-S310	Knowledge Management	100	3	1	0	4
BCA-S311	Major Project	150	0	3	6	5
BCA-S312	Presentation/Seminar based on Major Project	50	1			
		600	22			

Unified Syllabus by

Department of Computer Science, University of Lucknow

Bachelors of Computer Application

Semester-wise breakup of course

Course Code	Course Name	L	T	P	C
BCA-S101T	Computer Fundamental & Office Automation	3	0	0	3

UNIT-I

Introduction to Computers

Introduction, Characteristics of Computers, Block diagram of computer. Types of computers and features, Mini Computers, Micro Computers, Mainframe Computers, Super Computers. Types of Programming Languages (Machine Languages, Assembly Languages, High Level Languages). Data Organization, Drives, Files, Directories. Types of Memory (Primary And Secondary) RAM, ROM, PROM, EPROM. Secondary Storage Devices (FD, CD, HD, Pen drive) I/O Devices (Scanners, Plotters, LCD, Plasma Display) Number Systems Introduction to Binary, Octal, Hexadecimal system Conversion, Simple Addition, Subtraction, Multiplication.

UNIT-II

Algorithm and Flowcharts

Algorithm: Definition, Characteristics, Advantages and disadvantages, Examples Flowchart: Definition, Define symbols of flowchart, Advantages and disadvantages, Examples.

UNIT-III

Operating System and Services in O.S.

Dos – History, Files and Directories, Internal and External Commands, Batch Files, Types of O.S.

Windows Operating Environment Features of MS – Windows, Control Panel, Taskbar, Desktop, Windows Application, Icons, Windows Accessories, Notepad, Paintbrush.

UNIT-IV

Editors and Word Processors

Basic Concepts, Examples: MS-Word, Introduction to desktop publishing. **Spreadsheets and Database packages** Purpose, usage, command, MS-Excel, Creation of files in MS-Access, Switching between application, MS-PowerPoint.

Text Books :

1. Fundamental of Computers – By V.Rajaraman B.P.B. Publications
2. Fundamental of Computers – By P.K. Sinha
3. MS-Office 2000(For Windows) – By Steve Sagman

Unified Syllabus by

Department of Computer Science, University of Lucknow

Bachelors of Computer Application

Semester-wise breakup of course

Course Code	Course Name	L	T	P	C
BCA-S102T	Programming Principle & Algorithm	3	0	0	4

UNIT-I

Introduction to 'C' Language

History, Structures of 'C' Programming, Function as building blocks. **Language Fundamentals** Character set, C Tokens, Keywords, Identifiers, Variables, Constant, Data Types, Comments.

UNIT-II

Operators

Types of operators, Precedence and Associativity, Expression, Statement and types of statements

Build in Operators and function Console based I/O and related built in I/O function: printf(), scanf(), getch(), getchar(), putchar(); Concept of header files, Preprocessor directives: #include, #define.

UNIT-III

Control structures

Decision making structures: If, If-else, Nested If-else, Switch; Loop Control structures: While, Do-while, for, Nested for loop; Other statements: break, continue, goto, exit. **Introduction to problem solving** Concept: problem solving, Problem solving techniques (Trail & Error, Brain Storming, Divide & Conquer) Steps in problem solving (Define Problem, Analyze Problem, Explore Solution) Algorithms and Flowcharts (Definitions, Symbols), Characteristics of an algorithm Conditionals in pseudo-code, Loops in pseudo code. Time complexity: Big-Oh notation, efficiency Simple Examples: Algorithms and flowcharts (Real Life Examples).

UNIT-IV

Simple Arithmetic Problems

Addition / Multiplication of integers, Determining if a number is +ve / -ve / even / odd, Maximum of 2 numbers, 3 numbers, Sum of first n numbers, given n numbers, Integer division, Digit reversing, Table generation for n , a^b , Factorial, sine series, cosine series, nC_r , Pascal Triangle, Prime number, Factors of a number, Other problems such as Perfect number, GCD numbers etc (Write algorithms and draw flowchart), Swapping. **Functions** Basic types of function, Declaration and definition, Function call, Types of function, Parameter passing, Call by value, Call by reference, Scope of variable, Storage classes, Recursion.

Referential Books :

1. Programming in C-Balguruswamy
2. The C programming Lang., Pearson Ecl - Dennis Ritchie
3. Structured programming approach using C- Forouzah & Ceilber Thomson learning publication.

Unified Syllabus by

Department of Computer Science, University of Lucknow

Bachelors of Computer Application

Semester-wise breakup of course

Course Code	Course Name	L	T	P	C
BCA-S103	Principle of Management	4	0	0	4

UNIT-I

Nature of Management: Meaning, Definition, its nature purpose, importance & Functions, Management as Art, Science & Profession- Management as social System Concepts of management-Administration-Organization, Management Skills, Levels of Management. **Evolution of Management Thought:** Contribution of F.W.Taylor, Henri Fayol, Elton Mayo, Chester Barhard & Peter Drucker to the management thought. Business Ethics & Social Responsibility: Concept, Shift to Ethics, Tools of Ethics.

UNIT-II

Functions of Management: Part-I Planning – Meaning- Need & Importance, types, Process of Planning, Barriers to Effective Planning, levels – advantages & limitations. Forecasting- Need & Techniques Decision making-Types - Process of rational decision making & techniques of decision making Organizing – Elements of organizing & processes: Types of organizations, Delegation of authority – Need, difficulties Delegation – Decentralization Staffing – Meaning & Importance Direction – Nature – Principles Communication – Types & Importance. **Functions of Management: Part-II** Motivation – Importance – theories Leadership – Meaning – styles, qualities & function of leader Controlling - Need, Nature, importance, Process & Techniques, Total Quality Management Coordination – Need – Importance. Management of Change: Models for Change, Force for Change, Need for Change, Alternative Change Techniques, New Trends in Organization Change, Stress Management. **Strategic Management** Definition, Classes of Decisions, Levels of Decision, Strategy, Role of different Strategist, Relevance of Strategic Management and its Benefits, Strategic Management in India

UNIT-III

Fundamentals of Organizational Behaviour Nature, Scope, Definition and Goals of Organizational Behaviour; Fundamental Concepts of Organizational Behavior; Models of Organizational Behaviour; Emerging aspects of Organizational Behaviour: Meaning Cultural Diversity, Managing the Perception Process. **Perception, Attitude, Values and Motivation** Concept, Nature, Process, Importance, Management Behavioural aspect of Perception. Effects of employee attitudes; Personal and Organizational Values; Job Satisfaction; Nature and Importance of Motivation; Achievement Motive; Theories of Work Motivation: Maslow's Need Hierarchy Theory McGregers's Theory 'X' and Theory 'Y'.

UNIT-IV

Personality Definition of Personality, Determinants of Personality; Theories of Personality- Trait and Type Theories, The Big Five Traits, Mytes-Briggs Indicator; Locus of Control, SType A and Type B Assessment of Personality. **Work Stress** Meaning and definition of Stress, Symptoms of Stress; Sources of Stress: Individual Level, Group Level, Organizational Level; Stressors, Extra Organizational Stressors; Effect of Stress – Burnouts; Stress Management – Individual Strategies, Organizational Strategies; Employee Counselling **Group Behavior and Leadership** Nature of Group, Types of Groups; Nature and Characteristics of team; Team Building, Effective Teamwork; Nature of Leadership, Leadership Styles; Traits of Effective Leaders. **Conflict in Organizations** Nature of Conflict, Process of Conflict; Levels of Conflict – Intrapersonal, Interpersonal; Sources of Conflict; Effect of Conflict; Conflict Resolution, Meaning and types of Grievances & Process of Grievances Handling.

Text Books :

1. Essential of Management – Horold Koontz and Iteinz Weibrich- McGrawhills International
2. Management Theory & Practice – J.N.Chandan
3. Organizational Behavior Text, Cases and Games- By K.Aswathappa, Himalaya Publishing House, Mumbai, Sixth Edition (2005)
4. Organizational Behavior – Anjali Ghanekar

Unified Syllabus by
Department of Computer Science, University of Lucknow
Bachelors of Computer Application
Semester-wise breakup of course

Course Code	Course Name	L	T	P	C
BCA-S104	Business Communication	3	1	0	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 Dramatisation – 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, Principle of Effective writing, Writing Techniques, Electronic Writing Process. **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-IV

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

Text 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.

Unified Syllabus by
Department of Computer Science, University of Lucknow
Bachelors of Computer Application
Semester-wise breakup of course

Course Code	Course Name	L	T	P	C
BCA-S105	Mathematics -I	4	0	0	4

UNIT-I

DETERMINANTS:

Definition, Minors, Cofactors, Properties of Determinants MATRICES: Definition, Types of Matrices, Addition, Subtraction, Scalar Multiplication and Multiplication of Matrices, Adjoint, Inverse, Cramers Rule, Rank of Matrix Dependence of Vectors, Eigen Vectors of a Matrix, Caley-Hamilton Theorem (without proof).

UNIT-II

LIMITS & CONTINUITY:

Limit at a Point, Properties of Limit, Computation of Limits of Various Types of Functions, Continuity at a Point, Continuity Over an Interval, Intermediate Value Theorem, Type of Discontinuities

UNIT-III

DIFFERENTIATION:

Derivative, Derivatives of Sum, Differences, Product & Quotients, Chain Rule, Derivatives of Composite Functions, Logarithmic Differentiation, Rolle's Theorem, Mean Value Theorem, Expansion of Functions (Maclaurin's & Taylor's), Indeterminate Forms, L' Hospitals Rule, Maxima & Minima, Curve Tracing, Successive Differentiation & Liebnitz Theorem. **INTEGRATION:** 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).

UNIT-IV

VECTOR ALGEBRA:

Definition of a vector in 2 and 3 Dimensions; Double and Triple Scalar and Vector Product and physical interpretation of area and volume.

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.

Unified Syllabus by

Department of Computer Science, University of Lucknow

Bachelors of Computer Application

Semester-wise breakup of course

Course Code	Course Name	L	T	P	C
BCA-S101P	Computer Laboratory and Practical Work of Office Automation Practical will be based on Paper Office Automation: Covers UNIT-III, UNIT-IV, UNIT-V, UNIT-VI of Syllabus.	0	0	3	2
	Computer Laboratory and Practical Work of Programming Principle & Algorithm Practical will be based on Paper Programming Principle & Algorithm: Covers UNIT-III, UNIT-IV, UNIT-V, UNIT-VI of Syllabus	L	T	P	C
		0	0	3	2

Unified Syllabus by

Department of Computer Science, University of Lucknow

Bachelors of Computer Application

Semester-wise breakup of course

Course Code	Course Name	L	T	P	C
BCA-S106T	C Programming	3	0	0	3

UNIT-I

Arrays

Definition, declaration and initialization of one dimensional array; Accessing array elements; Displaying array elements; Sorting arrays; Arrays and function; Two-Dimensional array: Declaration and Initialization, Accessing and Displaying, Memory representation of array [Row Major, Column Major]; Multidimensional array

UNIT-II

Pointers

Definition and declaration, Initialization; Indirection operator, address of operator; pointer arithmetic; dynamic memory allocation; arrays and pointers; function and pointers

UNIT-III

Strings

Definition, declaration and initialization of strings; standard library function: strlen(), strcpy(), strcat(), strcmp(); Implementation without using standard library functions. **Structures** Definition and declaration; Variables initialization; Accessing fields and structure operations; Nested structures; Union: Definition and declaration; Differentiate between Union and structure.

UNIT-IV

Introduction C Preprocessor

Definition of Preprocessor; Macro substitution directives; File inclusion directives; Conditional compilation. **Bitwise Operators** Bitwise operators; Shift operators; Masks; Bit field. **File handling** Definition of Files, Opening modes of files; Standard function: fopen(), fclose(), feof(), fseek(), rewind(); Using text files: fgetc(), fputc(), fscanf() **Command line arguments.**

Text Books:

1. Programming in C-Balguruswamy
2. The C programming Lang., Person Ecl – Dennis Ritchie
3. Structured programming approach using C-Forouzah & Ceilberg Thomson learning publication.

Unified Syllabus by
Department of Computer Science, University of Lucknow
Bachelors of Computer Application
Semester-wise breakup of course

Course Code	Course Name	L	T	P	C
BCA-S107	Digital Electronics & Computer Organization	3	1	0	4

UNIT-I

Logic gates and circuit

Gates (OR, AND, NOR, NAND, XOR & XNOR); Demorgan's laws; Boolean laws, Circuit designing techniques (SOP, POS, K-Map).

UNIT-II

Combinational Building Blocks

Multiplexes; Decoder; Encoder; Adder and Subtractor.

UNIT-III

Memories

ROMs, PROMs, EPROMs, RAMs, Hard Disk, Floppy Disk and CD-ROM.

UNIT-IV

Sequential Building Blocks

Flip-Flop (RS, D, JK, Master-slave & T flip-flops); Registers & Shift registers; Counters; Synchronous and Asynchronous Designing method. **Memory Organization:** Basic cell of static and dynamic RAM; Building large memories using chips; Associative memory; Cache memory organization and Virtual memory organization.

Text Books:

- | | |
|---|---------------------|
| 1. Computer Architecture (PHI) 1998 | : M.M. Mano |
| 2. Digital Electronics (TMH) 1998 | : Malvino and Leach |
| 3. Computer Organization and Architecture | : William Stallings |

Unified Syllabus by
Department of Computer Science, University of Lucknow
Bachelors of Computer Application
Semester-wise breakup of course

Course Code	Course Name	L	T	P	C
BCA-S108	Management Information Systems	3	1	0	4

UNIT I

Introduction, Meaning and role of MIS, Definition of MIS, and System approach to MIS, MIS Organization, Development of Organizational Theory, Management and Organizational Behavior.

UNIT II

Evolution of Information system/ Basic Information Systems/ Decision Making and MIS, MIS as a technique for making Programmed Decisions, Appropriate MIS response, MIS planning, General Business planning, Derivation of MIS plan, Prioritization and development strategies.

UNIT III

Conceptual design of MIS, Definition of problem, System Objective and constraints, Analysis of info source, alternate system designs and selection, conceptual system design and document.

UNIT IV

Detailed system design and implementation, application of basic system design concept to MIS, Involvement of ND user and role of MIS department and system analyst, role of top management during design and implementation, system evaluation, review and update, Pit falls in MIS development

Text Books:

Unified Syllabus by
Department of Computer Science, University of Lucknow
Bachelors of Computer Application
Semester-wise breakup of course

Course Code	Course Name	L	T	P	C
BCA-S109	Financial Accounting & Management	3	1	0	4

UNIT-I

Overview - Meaning and Nature of Financial Accounting, Scope of Financial Accounting, Financial Accounting & Management Accounting, Accounting concepts & convention, Accounting standards in India.

UNIT-II

Basics of accounting – Capital & Revenue items, Application of Computer in Accounting Double Entry System, Introduction to Journal, Ledger and Procedure for Recording and Posting, Introduction to Trail Balance, Preparation of Final Account, Profit & Loss Account and related concepts, Balance Sheet and related concept.

UNIT-III

Financial statement analysis: Ratio analysis, Funds flow analysis, concepts, uses, Preparation of funds flow statement, simple problem, Cash flow analysis, Concepts, uses, preparation of cash flow statement, simple problem, Break – even analysis. Definition nature and Objective of Financial Management, Long Term Sources of Finance, Introductory idea about capitalization, Capital Structure, Concept of Cost of Capital, introduction, importance, explicit & implicit cost, Measurement of cost of capital, cost of debt.

UNIT-IV

Concept & Components of working Capital. Factors Influencing the Composition of working Capital, Objectives of working Capital Management – Liquidity Vs. Profitability and working capital policies. Theory of working capital: Nature and concepts. Cash Management, Inventory Management and Receivables Management.

Text Books:

1. Maheshwari & Maheshwari, “An Introduction to Accountancy”, 8th Edition, Vikas Publishing House, 2003
2. Gupta R.L., Gupta V.K., “Principles & Practice of Accountancy”, Sultan Chand & Sons, 1999.
3. Khan & Jain, “Financial Accounting”

Unified Syllabus by
Department of Computer Science, University of Lucknow
Bachelors of Computer Application
Semester-wise breakup of course

Course Code	Course Name	L	T	P	C
BCA-S110	Mathematics II	4	0	0	4

UNIT-I

SETS

Sets, Subsets, Equal Sets Universal Sets, Finite and Infinite Sets, Operation on Sets, Union, Intersection and Complements of Sets, Cartesian Product, Cardinality of Set, Simple Applications.

UNIT-II

RELATIONS AND FUNCTIONS

Properties of Relations, Equivalence Relation, Partial Order Relation Function: Domain and Range, Onto, Into and One to One Functions, Composite and Inverse Functions, Introduction of Trigonometric, Logarithmic and Exponential Functions.

UNIT-III

PARTIAL ORDER RELATIONS AND LATTICES

Partial Order Sets, Representation of POSETS using Hasse diagram, Chains, Maximal and Minimal Point, Glb, lub, Lattices & Algebraic Systems, Principle of Duality, Basic Properties, Sublattices, Distributed & Complemented Lattices.

UNIT-IV

FUNCTIONS OF SEVERAL VARIABLES Partial Differentiation, Change of Variables, Chain Rule, Extrema of Functions of 2 Variables, Euler's Theorem.

Text Books:

1. Kolman, Busby and Ross, "Discrete Mathematical Structure", PHI, 1996.
2. S.K. Sarkar, "Discrete Maths"; S. Chand & Co., 2000

Unified Syllabus by

Department of Computer Science, University of Lucknow

Bachelors of Computer Application

Semester-wise breakup of course

Course Code	Course Name	L	T	P	C
BCA-S106P	Computer Laboratory and Practical Work of C Programming	0	0	6	3
	Practical will be based on Paper Programming Principle & Algorithm: Covers UNIT-III, UNIT-IV, UNIT-V, UNIT-VI of Syllabus.				

Unified Syllabus by

Department of Computer Science, University of Lucknow

Bachelors of Computer Application

Semester-wise breakup of course

Course Code	Course Name	L	T	P	C
BCA-S201T	Object Oriented Programming Using 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, Parameteric Polymorphism. **Generic function** Template function, function name overloading, Overriding inheritance methods, Run time polymorphism, Multiple Inheritance.

UNIT-IV

Files and Exception Handling

Streams and files, Namespaces, Exception handling, Generic Classes

Text 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.The C programming Lang., Person Ecl – Dennis Ritchie
3. R.Lafore, “Object Oriented Programming using C++”, Galgotia Publications, 2004

Unified Syllabus by

Department of Computer Science, University of Lucknow

Bachelors of Computer Application

Semester-wise breakup of course

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

UNIT-IV

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

Text 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

Unified Syllabus by
Department of Computer Science, University of Lucknow
Bachelors of Computer Application
Semester-wise breakup of course

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 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. **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-IV

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

Text 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

Unified Syllabus by

Department of Computer Science, University of Lucknow

Bachelors of Computer Application

Semester-wise breakup of course

Course Code	Course Name	L	T	P	C
BCA-S204	Business Economics	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 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

Inflation, 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

Text Books:

1. Ahuja H.L., "Business Economics", S.Chand & Co., New Delhi, 2001
2. Ferfuson P.R., Rothchild, R and Ferguson G.J."Business Economics" Mac-millan, Hampshire, 1993
3. Karl E.Case & Ray C. fair , "Principles of Economics" , Pearson Education , Asia, 2000

Unified Syllabus by

Department of Computer Science, University of Lucknow

Bachelors of Computer Application

Semester-wise breakup of course

Course Code	Course Name	L	T	P	C
BCA-S205	Elements of Statistics	3	1	0	4

UNIT-I

Population, Sample and Data Condensation

Definition and scope of statistics, concept of population and sample 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. **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-IV

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. **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}.

Text 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 Welly and Sons
4. Goon, Gupta And Dasgupta - Fundamentals of statistics - The world press private ltd. , Kolkata.

Unified Syllabus by

Department of Computer Science, University of Lucknow

Bachelors of Computer Application

Semester-wise breakup of course

Course Code	Course Name	L	T	P	C
BCA-S201P	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.	0	0	3	2
	Computer Laboratory and Practical Work of DS Practical will be based on Paper Data Structure: Covers UNIT-III, UNIT-IV, UNIT-V, UNIT- VI of Syllabus	0	0	3	2

Unified Syllabus by

Department of Computer Science, University of Lucknow

Bachelors of Computer Application

Semester-wise breakup of course

Course Code	Course Name	L	T	P	C
BCA-S206T	Computer Graphics & Multimedia Application	3	0	0	3

UNIT-I

Introduction: The Advantages of Interactive Graphics, Representative Uses of Computer Graphics, Classification of Application Development of Hardware and software for computer Graphics, Conceptual Framework for Interactive Graphics, Overview, Scan: Converting Lines, Scan Converting Circles, Scan Converting Ellipses.

UNIT-II

Hardcopy Technologies, Display Technologies, Raster-Scan Display System, Video Controller, Random-Scan Display processor, Input Devices for Operator Interaction, Image Scanners, Working exposure on graphics tools like Dream Weaver, 3D Effects etc, **Clipping** Southland- Cohen Algorithm, Cyrus-Beck Algorithm, Midpoint Subdivision Algorithm.

UNIT-III

Geometrical Transformation

2D Transformation, Homogeneous Coordinates and Matrix Representation of 2D transformations, composition of 2D Transformations, the Window-to-Viewport Transformations, Introduction to 3D Transformations Matrix. **Representing Curves & Surfaces** Polygon meshes parametric, Cubic Curves, Quadric Surface; **Solid Modeling** Representing Solids, Regularized Boolean Set Operation primitive Instancing Sweep Representations, Boundary Representations, Spatial Partitioning Representations, Constructive Solid Geometry Comparison of Representations.

UNIT-IV

Introductory Concepts: Multimedia Definition, CD-ROM and the multimedia highway, Computer Animation (Design, types of animation, using different functions) Uses of Multimedia, Introduction to making multimedia – The stage of Project, hardware & software requirements to make good multimedia skills and Training opportunities in Multimedia Motivation for Multimedia usage.

Text Books:

1. Foley, Van Dam, Feiner, Hughes, Computer Graphics Principles & practice, 2000.
2. Ralf Skinmeiz and Klana Naharstedt, Multimedia: computing, Communication and Applications, pearson, 2001
3. D.Haran & Baker. Computer Graphics Prentice Hall of India, 1986

Unified Syllabus by
Department of Computer Science, University of Lucknow
Bachelors of Computer Application
Semester-wise breakup of course

Course Code	Course Name	L	T	P	C
BCA-S207	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.

Process Synchronization: Background, The Critical – Section Problem, Synchronization Hardware, Semaphores, Classical Problems of Synchronization

UNIT-III

Deadlocks: System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock. **Device Management:** Techniques for Device Management, Dedicated Devices, Shared Devices, Virtual Devices; Input or Output Devices, Storage Devices, Buffering, Secondary Storage Structure: Disk Structure, Disk Scheduling, Disk Management, Swap- Space Management, Disk Reliability

UNIT-IV

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, Consistency Semantics File – System Implementation: File – System Structure, Allocation Methods, Free- Space Management.

Text Books:

1. Silberschatz and Galvin, “ Operating System Concepts”, Person, 5th Ed. 2001
2. Madnick E., Donovan J., “ Operating Systems:”,Tata McGraw Hill,2001
3. Tannenbaum, “Operating Systems”, PHI, 4th Edition, 2000

Unified Syllabus by

Department of Computer Science, University of Lucknow

Bachelors of Computer Application

Semester-wise breakup of course

Course Code	Course Name	L	T	P	C
BCA-S208	Software Engineering	3	1	0	4

UNIT-I

Software Engineering: Definition and paradigms, A generic view of software engineering.

UNIT-II

Requirements Analysis: Statement of system scope, isolation of top level processes and entities and their allocation to physical elements, refinement and review.

Analyzing a problem, creating a software specification document, review for correctness, consistency, and completeness.

UNIT-III

Designing Software Solutions: Refining the software Specification; Application of fundamental design concept for data, architectural and procedural designs using software blue print methodology and object oriented design paradigm; Creating design document: Review of conformance to software requirements and quality. **Software Implementation:** Relationship between design and implementation, Implementation issues and programming support environment, Coding the procedural design, Good coding style and review of correctness and readability.

UNIT-IV

Software Maintenance: Maintenance as part of software evaluation, reasons for maintenance, types of maintenance (Perceptive, adoptive, corrective), designing for maintainability, techniques for maintenance. Comprehensive examples using available software platforms/case tools, Configuration Management.

Text Books:

1. K.K.Aggarwal & Yogesh Singh "Software engineering", 2nd Ed., New Age International 2005.
2. I.Sommerville, "Software Engineering", Addison Wesley, 2002.
3. James Peter, W. Pedrycz, "Software Engineering: An Engineering Approach" John Wiley & Sons.

Unified Syllabus by
Department of Computer Science, University of Lucknow
Bachelors of Computer Application
Semester-wise breakup of course

Course Code	Course Name	L	T	P	C
BCA-S209	Optimization Techniques	3	1	0	4

UNIT-I

Linear programming

Central Problem of linear Programming various definitions included Statements of basic theorem and also their properties, simplex methods, primal and dual simplex method, transport problem, tic-tac problem, and its solution. Assignment problem and its solution. Graphical Method Formulation, Linear Programming Problem.

UNIT-II

Queuing Theory

Characteristics of queuing system, Classification of Queuing Model Single Channel Queuing Theory, Generalization of steady state M/M/1 queuing models(Model-I, Model-II).

UNIT-III

Replacement Theory

Replacement of item that deteriorates replacement of items that fail. Group replacement and individual replacement. **Inventory Theory** Cost involved in inventory problem- single item deterministic model economics long size model without shortage and with shorter having production rate infinite and finite.

UNIT-IV

Job Sequencing

Introduction, solution of sequencing problem Johnson s algorithm for n jobs through 2 machines

Text Books:

1. Gillet B.E. "Introduction to Operation Research"
2. Taha,H.A. "Operation Research - an introduction"
3. Kanti Swarup "Operation Research"
4. S.D.Sharma "Operation Research"

Unified Syllabus by
Department of Computer Science, University of Lucknow
Bachelors of Computer Application
Semester-wise breakup of course

Course Code	Course Name	L	T	P	C
BCA-S210	Graph Theory	4	0	0	4

UNIT-I

What is graph Application of graphs, Finite and Infinite graphs, Incidence & Degree, Isolated vertex, Pendant Vertex, and Null Graph.

UNIT-II

Isomorphism, Sub graphs, A puzzle with multicolored Cubes, walks, Path, and circuits connected graph, Disconnected graphs and Components, Euler graphs, Operations on graphs more on Euler Graphs, Hamiltonian paths and circles.

UNIT-III

Tree, some properties of trees, pendant Vertices in a tree, Distance and centers in a tree Rooted and Binary trees, Spanning trees, fundamental circuits, Finding all spanning tree of a graph.

UNIT-IV

Cut-Sete, Some Properties of Cut-Set, All Cut-Sets in a graph, Path-Sets, some properties of paths sets in a graph, fundamental Circuits & Cut-Set, Connectively and separability. Directed graph, undirected graph. Matrix representation of graph.

Text Books:

1. Narsingh Deo, "Graph Theory", Prentice Hall of India.

Unified Syllabus by

Department of Computer Science, University of Lucknow

Bachelors of Computer Application

Semester-wise breakup of course

Course Code	Course Name	L	T	P	C
BCA-S206P	Computer Laboratory and Practical Work of Computer Graphics & Multimedia Application	0	0	6	3

Practical will be based on Paper Computer Graphics & Multimedia Application: Covers UNIT- II, UNIT-III, UNIT-V of Syllabus

Unified Syllabus by
Department of Computer Science, University of Lucknow
Bachelors of Computer Application
Semester-wise breakup of course

Course Code	Course Name	L	T	P	C
BCA-S301T	Introduction to DBMS	3	0	0	3

UNIT-I

Introduction: Characteristics of database approach, data models, DBMS architecture and data independence.

UNIT-II

E-R Modeling: Entity types, Entity set, attribute and key, relationships, relation types, roles and structural constraints, weak entities, enhanced E-R and object modeling, Sub classes; Super classes, inheritance, specialization and generalization.

UNIT-III

File Organization: Indexed sequential access files; implementation using B & B++ trees, hashing, hashing functions, collision resolution, extendible hashing, dynamic hashing approach implementation and performance. **Relational Data Model:** Relational model concepts, relational constraints, relational algebra **SQL:** SQL queries, programming using SQL.

UNIT-IV

EER and ER to relational mapping: Data base design using EER to relational language. **Data Normalization:** Functional Dependencies, Normal form up to 3rd normal form. Concurrency Control: Transaction processing, locking techniques and associated, database recovery, security and authorization. Recovery Techniques, Database Security.

Text Books:

1. Abraham Silberschatz, Henry Korth, S.Sudarshan, "Database Systems Concepts", 4th Edition, McGraw Hill, 1997.
2. Jim Melton, Alan Simon, "Understanding the new SQL: A complete Guide", Morgan Kaufmann Publishers, 1993.
3. A.K.Majumdar, P. Bhattacharya, "Database Management Systems", TMH, 1996.
4. Bipin Desai, "An Introduction to database systems", Galgotia Publications, 1991.

Unified Syllabus by
Department of Computer Science, University of Lucknow
Bachelors of Computer Application
Semester-wise breakup of course

Course Code	Course Name	L	T	P	C
BCA-S302T	Java Programming and Dynamic Webpage Design	3	0	0	3

UNIT-I

Java Programming: Data types, control structured, arrays, strings, and vector, classes (inheritance, package, exception handling) multithreaded programming.

UNIT-II

Java applets, AWT controls (Button, Labels, Combo box, list and other Listeners, menu bar) layout manager, string handling (only main functions)

UNIT-III

Networking (datagram socket and TCP/IP based server socket) event handling, JDBC: Introduction, Drivers, Establishing Connection, Connection Pooling. HTML: use of commenting, headers, text styling, images, formatting text with , special characters, horizontal rules, line breaks, table, forms, image maps, <META> tags, <FRAMESET> tags, file formats including image formats.

UNIT-IV

Java Servlets: Introduction, HTTP Servlet Basics, The Servlet Lifecycle, Retrieving Information, Sending HTML Information, Session Tracking, Database Connectivity. **Java Server Pages:** Introducing Java Server Pages, JSP Overview, Setting Up the JSP Environment, Generating Dynamic Content, Using Custom Tag Libraries and the JSP Standard Tag Library, Processing Input and Output.

Text Books:

1. Patrick Naughton and Herbertz Schildt, "Java-2 The Complete Reference" 199, TMH.
2. Shelley Powers, "Dynamic Web Publishing" 2nd Ed. Techmedia, 1998.
3. Ivor Horton, "Beginning Java-2" SPD Publication
4. Jason Hunter, "Java Servlet Programming" O'Reilly

Unified Syllabus by

Department of Computer Science, University of Lucknow

Bachelors of Computer Application

Semester-wise breakup of course

Course Code	Course Name	L	T	P	C
BCA-S303	Data Communication & Computer Network	3	1	0	4

UNIT-I

Basic Concepts: Components of data communication, distributed processing, standards and organizations. Line configuration, topology, Transmission mode, and categories of networks. **OSI and TCP/IP Models:** Layers and their functions, comparison of models. **Digital Transmission:** Interfaces and Modems: DTE-DCE Interface, Modems, Cable modems.

UNIT-II

Transmission Media: Guided and unguided, Attenuation, distortion, noise, throughput, propagation speed and time, wavelength, Shannon capacity, comparison of media

UNIT-III

Telephony: Multiplexing, error detection and correction: Many to one, One to many, WDM, TDM, FDM, Circuit switching, packet switching and message switching. **Data link control protocols:** Line discipline, flow control, error control, synchronous and asynchronous protocols, character and bit oriented protocols, Link access procedures. **Point to point controls:** Transmission states, PPP layers, LCP, Authentication, NCP. **ISDN:** Services, Historical outline, subscriber's access, ISDN Layers and broadcast ISDN.

UNIT-IV

Devices: Repeaters, bridges, gateways, routers, The Network Layer; Design issues, Routing algorithms, Congestion control Algorithms, Quality of service, Internetworking, Network-Layer in the internet. **Transport and upper layers in OSI Model:** Transport layer functions, connection management, functions of session layers, presentation layer and application layer.

Text Books:

1. Brijendra Singh, "Data Communication and Computer Networks", PHI, Second Ed. 2006
2. A.S.Tanenbaum, "Computer Networks"; Pearson Education Asia, 4th Ed. 2003.
3. Behrouz A.Forouzan, "Data Communication and Networking", 3rd Ed. Tata MCGraw Hill, 2004.

Unified Syllabus by
Department of Computer Science, University of Lucknow
Bachelors of Computer Application
Semester-wise breakup of course

Course Code	Course Name	L	T	P	C
BCA-S304	Numerical Methods	3	1	0	4

UNIT-I

Roots of Equations: Bisections Method, False Position Method, Newton's Raphson Method, Rate of convergence of Newton's method.

UNIT-II

Interpolation and Extrapolation : Finite Differences, The operator E, Newton's Forward and Backward Differences, Newton's dividend differences formulae, Lagrange's Interpolation formula for unequal Intervals, Gauss's Interpolation formula, Starling formula, Bessel's formula, Laplace-Everett formula.

UNIT-III

Numerical Differentiation Numerical Integration : Introduction, direct methods, maxima and minima of a tabulated function, General Quadratic formula, Trapezoidal rule, Simpson's One third rule, Simpson's three- eight rule.

UNIT-IV

Solution of Linear Equation: Gauss's Elimination method and Gauss's Siedel iterative method.
Solution of Differential Equations: Euler's method, Picard's method, Fourth-order Ranga – Kutta method.

Text Books:

1. Scarbourogh, "Numerical Analysis".
2. Gupta & Bose S.C. "Introduction to Numerical Analysis, "Academic Press, Kolkata, 3.
3. S.S. Shashtri, " Numerical Analysis", PHI

Unified Syllabus by

Department of Computer Science, University of Lucknow

Bachelors of Computer Application

Semester-wise breakup of course

Course Code	Course Name	L	T	P	C
BCA-S305	Minor Project	0	1	2	2

Evaluation will be based on Summer Training held after fourth semester in following organization: R & D organization, Govt. Sector, BSNL, ITI, RDSO, NIC, PNB and it will be by super wised & Evaluated by Department teacher / Examiner appointed by the concerned University only.

Unified Syllabus by
Department of Computer Science, University of Lucknow
Bachelors of Computer Application
Semester-wise breakup of course

Course Code	Course Name	L	T	P	C
BCA-S306	Viva-Voice on Summer Training	0	0	2	1

The viva will be conducted based on summer training of four weeks after the end of fourth Semester and will be Conducted by the Examiner appointed by the concerned University only.

Unified Syllabus by

Department of Computer Science, University of Lucknow

Bachelors of Computer Application

Semester-wise breakup of course

Course Code	Course Name	L	T	P	C
BCA-S301P	Computer Laboratory and Practical Work of DBMS Practical will be based on Paper Data Base Management System : on UINT-IV converging the concept from UNIT-II to UNIT-VI of Syllabus.	0	0	3	2
	Computer Laboratory and Practical Work of Java Programming and Dynamic Webpage Design				
	Practical will be based on Paper Java Programming & Website Design: on Whole Syllabus				

Unified Syllabus by
Department of Computer Science, University of Lucknow
Bachelors of Computer Application
Semester-wise breakup of course

Course Code	Course Name	L	T	P	C
BCA-S307	Network Security and Management	4	0	0	4

UNIT-I

Introduction: Attack, Services and Mechanism, Model for Internetwork Security.
Cryptography: Notion of Plain Text, Encryption, Key, Cipher Text, Decryption and cryptanalysis;
Public Key Encryption, digital Signatures and Authentication.

UNIT-II

Network Security:

Authentication Application: Kerberos, X.509, Directory Authentication Service, Pretty Good Privacy, S/Mime.

UNIT-III

IP security Architecture: Overview, Authentication header, Encapsulating Security Pay Load combining Security Associations, Key Management. **Web Security:** Requirement, Secure Socket Layer, Transport Layer Security, and Secure Electronic Transactions.

UNIT-IV

Network Management Security: Overview of SNMP Architecture-SMMPV11 Communication Facility, SNMPV3. **System Security:** Intruders, Viruses and Related Threats, Firewall Design Principles. Comprehensive examples using available software platforms/case tools, Configuration Management.

Text Books:

1. Brijendra Singh, "Network Security and Management", PHI, Second Ed. 2009
2. W. Stallings, Networks Security Essentials: Application & Standards, Pearson Education, 2000.
3. W. Stallings, Cryptography and Network Security, Principles and Practice, Pearson Education, 2000.

Unified Syllabus by
Department of Computer Science, University of Lucknow
Bachelors of Computer Application
Semester-wise breakup of course

Course Code	Course Name	L	T	P	C
BCA-S308	Information System: Analysis Design & Implementation	3	1	0	4

UNIT-I

Overview of System Analysis and Design: Systems Development Life Cycle; concept and Models: requirements determination, logical design, physical design, test planning, implementation, planning and performance evaluation, communication, interviewing, presentation skills; group dynamics; risk and feasibility analysis; group based approaches, JAD, structures walkthroughs, and design and code reviews; prototyping; database design software quality metrics; application categories software package evaluation and acquisition.

UNIT-II

Information Requirement Analysis: Process modeling with physical logical data flow diagrams, data modeling with logical entity relationship diagrams.

UNIT-III

Developing a Proposal: Feasibility study and cost estimation. **System Design:** Design of input and control, design of output and control, file design/database design, process, user interface design, prototyping; software constructors; documentation. **Application Development Methodologies and CASE tools:** Information engineering structured system analysis and design, and object oriented methodologies for application development data modeling, process modeling, user interface design, and prototyping, use of computer aided software engineering (CASE) tools in the analysis design and implementation of information systems.

UNIT-IV

Design and Implementation on OO Platform: Object oriented analysis and design through object modeling technique, object modeling, dynamic modeling and functional object oriented design and object oriented programming systems for implementation, object oriented data bases. **Managerial issues in Software Projects:** Introduction to software markets; planning of software projects, size and cost estimates; project scheduling; measurement of software quality and productivity, ISO and capability maturity models for organizational growth.

Text Books:

1. I.T.Haryszkiewicz, Introduction of System Analysis and Design, Pearson Education, (PHI) 1998.
2. V.Rajaraman, Analysis and Design of Information System, Pearson Education, 1991.
3. J.A.Senn, "Analysis and Design of Information Systems"

Unified Syllabus by
Department of Computer Science, University of Lucknow
Bachelors of Computer Application
Semester-wise breakup of course

Course Code	Course Name	L	T	P	C
BCA-S309	E-Commerce	4	0	0	4

UNIT-I

Introduction to E-Commerce: The Scope of Electronic Commerce, Definition of Electronic Commerce, Electronic E-commerce and the Trade Cycle, Electronic Markets, Electronic Data Interchange, Internet Commerce, E-Commerce in Perspective **Business Strategy in an Electronic Age:** Supply Chains, Porter's Value Chain Model, Inter Organizational Value Chains, Competitive Strategy, Porter's Model, First Mover Advantage Sustainable Competitive Advantage, Competitive Advantage using E-Commerce, Business Strategy, Introduction to Business Strategy, Strategic Implications of IT, Technology, Business Environment, Business Capability, Exiting Business Strategy, Strategy Formulation & Implementation Planning, E-Commerce Implementation, E-Commerce Evaluation.

UNIT-II

Business-to-Business Electronic Commerce: Characteristics of B2B EC, Models of B2B Ec, Procurement Management Using the Buyer's Internal Marketplace, Just in Time Delivery, Other B2B Models, Auctions and Services from Traditional to Internet Based EDI, Intergration with Back-end Information System, The Role of Software Agents for B2B EC, Electronic marketing in B2B, Solutions of B2B EC, Managerial Issues, Electronic Data Interchange (EDI), EDI: The Nuts and Bolts, EDI & Business.

UNIT-III

Internet and Extranet : Automotive Network Exchange, The Largest Extranet, Architecture of the Internet, Intranet and Extranet, Intranet software, Applications of Intranets, Intranet Application Case Studies, Considerations in Intranet Deployment, The Extranets, The structures of Extranets, Extranet products & services, Applications of Extranets, Business Models of Extranet Applications, Managerial Issues. **Electronic Payment Systems :** Is SET a failure, Electronic Payments & Protocols, Security Schemes in Electronic payment systems, Electronic Credit card system on the Internet, Electronic Fund transfer and Debit cards on the Internet, Stored – value Cards and E- Cash, Electronic Check Systems, Prospect of Electronic Payment Systems, Managerial Issues.

UNIT-IV

Public Policy: From Legal Issues to Privacy : EC- Related Legal Incidents, Legal Incidents, Ethical & Other Public Policy Issues, Protecting Privacy, Protecting Intellectual Property, Free speech, Internet Indecency & Censorship, Taxation & Encryption Policies, Other Legal Issues: Contracts, Gambling & More, Consumer & Seller Protection In EC. Infrastructure For EC : It takes more than Technology, A Network Of Networks, Internet Protocols, Web- Based client/ Server, Internet Security, selling on the web, Chatting on the Web, Multimedia delivery, Analyzing Web Visits, Managerial Issues.

Text Books:

1. David Whiteley, "E-Commerce", Tata McGraw Hill, 2000
2. Eframi Turban, Jae Lee, David King, K. Michale Chung, "Electronic Commerce", Pearson Education, 2000

Unified Syllabus by
Department of Computer Science, University of Lucknow
Bachelors of Computer Application
Semester-wise breakup of course

Course Code	Course Name	L	T	P	C
BCA-S310	Knowledge Management	3	1	0	4

UNIT-I

Business Intelligence and Business Decisions: Modeling Decision Process; Decision support systems; Group decision support and Groupware Technologies.

UNIT-II

Executive Information and support Systems: Business Expert System and AI, OLTO & OLAP; Data Warehousing; Data Marts, Data Warehouse architecture; Tools for data warehousing.

UNIT-III

Multi- Dimensional analysis: Data mining and knowledge discovery; Data mining and Techniques; Data mining of Advance Databases.

UNIT-IV

Knowledge Management Systems: Concept and Structure KM systems, techniques of knowledge management appreciation & limitation.

Text Books:

1. Decision support system, EIS, 2000
2. W.H.Inmon, "Building Data Warehousing", Willey, 1998.
3. Han, Jiawei, Kamber, Micheline, "Data Mining Concepts & Techniques", Harcourt India, 2001

Unified Syllabus by
Department of Computer Science, University of Lucknow
Bachelors of Computer Application
Semester-wise breakup of course

Course Code	Course Name	L	T	P	C
BCA-S311	Major Project	0	3	6	5

The allotment of the project will be held after fifth semester. The major project will be in the following organization: R & D organization, Govt. Sector, BSNL, ITI, RDSO, NIC, PNB and it will be supervised & Evaluated by Department teacher / Examiner appointed by the concerned University only.

Unified Syllabus by

Department of Computer Science, University of Lucknow

Bachelors of Computer Application

Semester-wise breakup of course

Course Code	Course Name	L	T	P	C
BCA-S312	Presentation/Seminar based on Major Project				1

Presentation/Seminar based on Major Project will be evaluated by external examiner appointed by the concerned University.