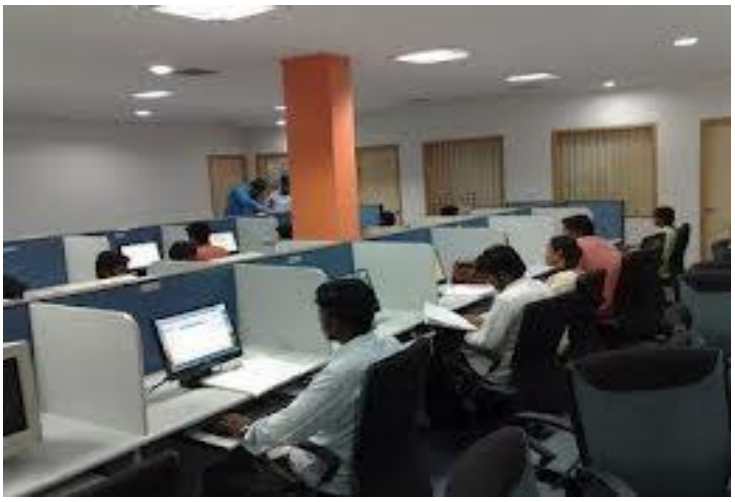
BACHELOR OF COMPUTER APPLICATION (BCA)

THREE YEAR FULL - TIME PROGRAMME



COURSE CURRICULUM

INSTITUTE OF MANAGEMENT STUDIES

ADHYATMIK NAGAR CAMPUS, GHAZIABD

(An **ISO 9001:2000** Certified Institution)

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CHAUDHARY CHARAN SINGH UNIVERSITY, MEERUT

THREE YEARS BACHELOR OF COMPUTER APPLICATION PROGRAMME

COURSE CONTENT (w.e.f. August 2011)

SEMESTER I

COURSE CODE	COURSE NAME
BCA-101	Mathematics –I (MATHS)
BCA-102	Programming Principle & Algorithm (PPA)
BCA-103	Computer Fundamental & Office Automation (CFOA)
BCA-104	Principle of Management (POM)
BCA-105	Business Communication (BC)
BCA-106P	Computer Laboratory and Practical Work of Office Automation
BCA-107P	Computer Laboratory & Practical Work of C Programming
QUALIFYING PAPER	
008	Environmental Studies (EVS)

SEMESTER II

COURSE CODE	COURSE NAME
BCA-201	Mathematics II (MATHS)
BCA-202	C Programming (C Prog)
BCA-203	Organization Behavior (OB)
BCA-204	Digital Electronics & Computer Organization (DECO)
BCA-205	Financial Accounting & Management (FAM)
BCA-206P	Computer Laboratory and Practical Work of C Programming

SEMESTER III

COURSE CODE	COURSE NAME
BCA-301	Object Oriented Programming Using C++ (C++)
BCA-302	Data Structure Using C & C++ (DSC)
BCA-303	Computer Architecture & Assembly Language (CAAL)
BCA-304	Business Economics (BE)
BCA-305	Elements of Statistics (EL)
BCA-306P	Computer Laboratory and Practical Work of OOPS
BCA-307P	Computer Laboratory and Practical Work of DS

SEMESTER IV

COURSE CODE	COURSE NAME
BCA-401	Computer Graphics & Multimedia Application (CGMA)
BCA-402	Operating System (OS)
BCA-403	Software Engineering (SE)
BCA-404	Optimization Techniques (OT)
BCA-406	Mathematics-III (MATHS)
BCA-405	Computer Laboratory and Practical Work of CGMA

SEMESTER V

COURSE CODE	COURSE NAME
BCA-501	Introduction to DBMS
BCA-502	Java Programming and Dynamic Webpage Design
BCA-503	Computer Network
BCA-504	Numerical Methods
BCA-505P	Minor Project
BCA-506P	Viva-Voice on Summer Training
BCA-507P	Computer Laboratory and Practical Work of DBMS
BCA-508P	Computer Laboratory and Practical Work of Java Programming & Dynamic Webpage Design

SEMESTER VI

COURSE CODE	COURSE NAME
BCA-601	Computer Network Security
BCA-602	Information System: Analysis Design & Implementation
BCA-603	E-Commerce
BCA-604	Knowledge Management
BCA-605P	Major Project
BCA-506P	Presentation/Seminar based on Major Project

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THREE YEARS BACHELOR OF COMPUTER APPLICATION PROGRAMME

COURSE CONTENT FOR SEMESTER – I

BCA-101 MATHEMATICS -I

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– II	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.
Unit– IV	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 – V	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.

Referential Books:

1. .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.

BCA-102 PROGRAMMING PRINCIPLE & ALGORITHM

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, Dowhile, for, Nested for loop; Other statements: break, continue, goto, exit.
Unit– IV	Introduction to problem solving	Concept: problem solving, Problem solving techniques (Trail & Error, Brain Stroming, 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 – V	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
Unit-VI	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. Let us C-Yashwant Kanetkar.
2. Programming in C-Balguruswamy
3. The C programming Lang., Pearson Ecl - Dennis Ritchie
4. Structured programming approach using C- Forouzah & Ceilber Thomson learning publication.
5. Pointers in C - Yashwant Kanetkar
6. How to solve it by Computer - R.G. Dromy
7. Peter Norton's Introduction to Computers - Tata MGHill

BCA-103 COMPUTER FUNDAMENTAL & OFFICE AUTOMATION

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.
Unit– IV	Windows Operating Environment	Features of MS - Windows, Control Panel, Taskbar, Desktop, Windows Application, Icons, Windows Accessories, Notepad, Paintbrush.
Unit – V	Editors and Word Processors	Basic Concepts, Examples: MS-Word, Introduction to desktop publishing.
Unit – VI	Spreadsheets and Database packages	Purpose, usage, command, MS-Excel, Creation of files in MS-Access, Switching between application, MS-PowerPoint.

Referential Books:

1. Fundamental of Computers - By V.Rajaraman B.P.B. Publications
2. Fundamental of Computers - By P.K. Sinha
3. Computer Today- By Suresh Basandra
4. Unix Concepts and Application - By Sumitabha Das
5. MS-Office 2000(For Windows) - By Steve Sagman
6. Computer Networks - By Tennenbum Tata MacGrow Hill Publication

BCA-104 PRINCIPLE OF MANAGEMENT

Unit – I	Nature of Management:	Meaning, Defination, it's nature purpose, importance & Functions, Management as Art, Science & Profession- Management as social System Concepts of management-Administration-Organization, Management Skills, Levels of Management.
Unit – II	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– III	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
Unit– IV	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
Unit – V		Management of Change: Models for Change, Force for Change, Need for Change, Alternative Change Techniques, New Trends in Organization Change, Stress Management.
Unit – VI	: 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

Referential Books :

1. Essential of Management - Horold Koontz and Iteinz Weibrich- McGrawhills International
2. Management Theory & Practice - J.N.Chandan
3. Essential of Business Administration - K.Aswathapa, Himalaya Publishing House
4. Principles & practice of management - Dr. L.M.Parasad, Sultan Chand & Sons - New Delhi
5. Business Organization & Management - Dr. Y.K.Bhushan
6. Management: Concept and Strategies By J.S. Chandan, Vikas Publishing
7. Principles of Management, By Tripathi, Reddy Tata McGraw Hill
8. Business organization and Management by Talloo by Tata McGraw Hill
9. Business Environment and Policy - A book on Strategic Management/ Corporate Planning By Francis Cherunilam Himalaya Publishing House 2001 Edition

BCA-105 BUSINESS COMMUNICATION

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
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: Topics Prescribed for workshop/skill lab	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. 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 Pvt. Ltd., New Delhi.
5) Business Communication - Dr.S.V.Kadvekar, Prin.Dr.C.N.Rawal and Prof.Ravindra Kothavade- Diamond Publications, Pune.
6) Business Correspondence and Report Writing - R.C. Sharma, Krishna Mohan – Tata McGraw-Hill Publishing Company Limited, New Delhi.
7) Communicate to Win - Richard Denny - Kogan Page India Privat Limited, New Delhi.
8) Modern Business Correspondence - L.Gartside - The English Language Book Society and Macdonald and Evans Ltd.
9) Business Communication - M.Balasubrahmanyan -Vani Education Books. 10) Creating a Successful CV -Siman Howard – Dorling Kidersley.

106P 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

107P 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

QUALIFYING PAPER

ENVIRONMENTAL STUDIES (CODE-008)

UNIT-1: THE MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES

Definition, Scope and Importance, Need for Public Awareness.

UNIT-2: NATURAL RESOURCES

- Renewable and Non-renewable Resources:

Natural resources and associated problems: -

a) FOREST RESOURCES: use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.

b) WATER RESOURCES: use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.

c) MINERAL RESOURCES: use and exploitation, environmental effects of extracting and using mineral resources, case studies.

d) FOOD RESOURCES: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.

e) ENERGY RESOURCES: Growing energy needs, renewable and nonrenewable energy sources, use of alternate energy sources, case studies

f) LAND RESOURCES: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.

- Role of an individual in conservation of natural resources.
- Equitable use of resources for sustainable lifestyles

UNIT-3: ECOSYSTEMS

- Concept of an ecosystem
- Structure and function of an ecosystem
- Producers, consumers and decomposers
- Energy flow in the ecosystem
- Ecological succession

- Food chains, food webs and ecological pyramids
- Introduction, types, characteristic features, structure and function of the following ecosystem: -
    a) Forest ecosystem
    b) Grassland ecosystem
    c) Desert ecosystem
    d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

UNIT-4: BIODIVERSITY AND ITS CONSERVATION

- Introduction – Definition: genetic, species and ecosystem diversity.
- Biogeographical classification of India
- Value of biodiversity: Consumptive use, productive use, social, ethical, and aesthetic and option values.
- Biodiversity at global, National and local levels.
- India as a mega-diversity nation
- Hot-sports of biodiversity.
- Threats to biodiversity: Habitat loss, poaching of wildlife, man-wildlife conflicts.
- Endangered and endemic species of India
- Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT-5: ENVIRONMENTAL POLLUTION

DEFINITION:

- Causes, effects and control measures of: -
    a) Air pollution
    b) Water pollution
    c) Soil pollution
    d) Marine pollution
    e) Noise pollution
    f) Thermal pollution
    g) Nuclear pollution

- Solid waste Management: Causes, effects and control measures of urban and industrial wastes.
- Role of an individual in prevention of pollution
- Pollution case studies
- Disaster Management: Floods, earthquake, cyclone and landslides.

UNIT-6: SOCIAL ISSUES AND THE ENVIRONMENT

- From Unsustainable to Sustainable development
- Urban problems related to energy.
- Water conservation, rain water harvesting, watershed management
- Resettlement and rehabilitation of people; its problems and concerns. Case Studies

- Environmental Ethics: Issues and possible solutions.
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies.
- Wasteland reclamation.
- Consumerism and waste products
- Environment Protection Act.
- Air (Prevention and Control of Pollution) Act
- Water (Prevention and Control of Pollution) Act
- Wildlife Protection Act
- Forest Conservation Act
- Issues involved in enforcement of environmental legislation
- Public awareness

UNIT-7: HUMAN POPULATION AND THE ENVIRONMENT

- Population growth, variation among nations.
- Population explosion: Family Welfare Programme.
- Environment and human health
- Human Rights
- Value Education
- Women and Child Welfare
- Role of Information Technology in Environment and human health
- Case Studies

UNIT-8: FIELD WORK

- Visit to a local area to document environmental assets-river / forest / grassland / hill / mountain.
- Visit to a local polluted site – Urban / Rural / Industrial / Agricultural
- Study of common plants, insects, birds.
- Study of simple ecosystems-pond, river, hill slopes, etc. (Field work Equal to 5 lecture hours).

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COURSE CONTENT FOR SEMESTER – II

BCA-201 Mathematics II

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 Trignometric, 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 & Algebric Systems, Principle of Duality, Basic Properties, Sublattices, Distributed & Complemented Lattics
Unit– IV	**Functions of several variables**	Partial Differentiation, Change of Variables, Chain Rule, Extrema of Functions of 2 Variables, Euler's Theorem
Unit – V	**3d coordinate geometry**	3D Coordinate Geometry: Coordinates in Space, Direction Cosines, Angle Between Two Lines, Projection of Join of Two Points on a Plane, Equations of Plane, Straight Lines, Conditions for a line to lie on a plane, Conditions for Two Lines to be Coplanar, Shortest Distance Between Two Lines, Equations of Sphere, Tangent plane at a point on the sphere
Unit – VI	**Multiple integration**	Double Integral in Cartesian and Polar Coordinates to find Area, Change of Order of Integration, Triple Integral to Find Volume of Simple Shapes in Cartesian Coordinates.

Referential Books:

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

BCA-202 C Programming

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– II	**Strings**	Definition, declaration and initialization of strings; standard library function: strlen(), strcpy(), strcat(), strcmp(); Implementation without using standard library functions
Unit– IV	**Structures**	Definition and declaration; Variables initialization; Accessing fields and structure operations; Nested structures; Union: Definition and declaration; Differentiate between Union and structure
Unit – V	**Introduction C Preprocessor**	Definition of Preprocessor; Macro substitution directives; File inclusion directives; Conditional compilation
	Bitwise Operators	Bitwise operators; Shift operators; Masks; Bit field
Unit – VI	**File handling**	Definition of Files, Opening modes of files; Standard function: fopen(), fclose(), feof(), fseek(), fewind();Using text files: fgetc(), fputc(), fscanf()
	Command line arguments	

Referential Books:

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

BCA-203 Organization Behavior

Unit – I	**Fundamentals of Organizational Behaviour**	Nature, Scope, Definition and Goals of organizational Behaviour; Fundamental Concepts of Organizational Behaviour; Models of Organizational Behaviour; Emerging aspects of Organizational Behaviour: Meaning Cultural Diversity, Managing the Perception Process
Unit – II	**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 McGregcrs's Theory 'X' and Theory 'Y'
Unit– III	**Personality**	Definition of Personality, Determinants of Personality; Theories of Personality- Trait and Type Theories, The Big Five Traites, Mytes-Briggs Indicator; Locus of Control, SType A and Type B Assessment of Personality
Unit– IV	**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
Unit – V	**Group Behaviour 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
Unit – VI	**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.

Referential Books:

1. Organizational Behavior Text, Cases and Games- By K.Aswathappa, Himalaya Publishing House, Mumbai, Sixth Edition (2005)

2.Organizational Behavior Human Behavior at Work By J.W. Newstrom, Tata McGraw Hill Publishing Company Limited, New Delhi, 12th Edition (2007)

3 Organizational Behavior - By Fred Luthans

4 Organizational Behavior - By Super Robbins

5. Organizational Behavior - Anjali Ghanekar

6.Organizational Behavior Fundamentals, Realities and Challenges By Detra Nelson, James Campbel Quick Thomson Publications

7.Organizational Behavior through Indian Philosophy, By N.M.Mishra, Hikalaya Publication House

BCA-204 Digital Electronics & Computer Organization

Unit – I	**Logic gates and circuit**	Gates (OR, AND, NOR, NAND, XOR & XNOR); Demogran's laws; Boolean laws, Circuit designing techniques (SOP, POS, K-Map).
Unit – II	**Combinational Building Blocks**	Multiplexes; Decoder; Encoder; Adder and Subtracter.
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
Unit – V	**Memory Organization**	Basic cell of static and dynamic RAM; Building large memories using chips; Associative memory; Cache memory organization and Virtual memory organization

Referential Books:

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

BCA-205 Financial Accounting & Management

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

Unit– IV : 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 – V : 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

Unit – VI : Cash Management, Inventory Management and Receivables Management

Referential 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"
4. Maheshwari S.N., "Principles of Management Accounting", 11th Edition, Sultan Chand & Sons, 2001
5. Shukla and Grewal, "Advanced Accounts", 14th Edition, Sultan Chand & Sons.

BCA-206 Computer Laboratory and Practical Work of C Programming

Practical will be based on Paper Programming Principle & Algorithm: Covers UNIT-III, UNIT-IV, UNIT-V, UNIT-VI of Syllabus

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COURSE CONTENT FOR SEMESTER – III

BCA-301 Object Oriented Programming Using C++

Unit – I	Introduction	Introducing Object- Oriented Approach, Relating to other paradigms {Functional, Data decomposition}.
	Basic terms and ideas	Abstraction, Encapsulation, Inheritance, Polymorphism, Review of C, Difference between C and C++ - cin, cout, new, delete, operators.
Unit – II	Classes and Objects	Encapsulation, information hiding, abstract data types, Object & classes, attributes, methods, C++ class declaration, State identity and behaviour of an object, Constructors and destructors, instantiation of objects, Default parameter value, object types, C++ garbage collection, dynamic memory allocation, Metaclass / abstract classes.
Unit– III	Inheritance and Polymorphism	Inheritance, Class hierarchy, derivation - public, private & protected, Aggregation, composition vs classification hierarchies, Polymorphism, Categorization of polymorphism techniques, Method polymorphism, Polymorphism by parameter, Operator overloading, Parametric Polymorphism
Unit– IV	Generic function	Template function, function name overloading, Overriding inheritance methods, Run time polymorphism, Multiple Inheritance.
Unit – V	Files and exception Handling	Streams and files, Namespaces, Exception handling, Generic Classes

Referential Books:

1. A.R.Venugopal, Rajkumar, T. Ravishanker “Mastering C++”, TMH, 1997.
2. S.B.Lippman & J.Lajoie, “ C++ Primer”, 3rd Edition, Addison Wesley, 2000.The C programming Lang., Person Ecl - Dennis Ritchie
3. R.Lafore, “Object Oriented Programming using C++”, Galgotia Publications, 2004
4. D.Parasons, “Object Oriented Programming using C++”, BPB Publication.

BCA-302 Data Structure Using C & C++

Unit – I	Introduction to Data Structure and its Characteristics Array	Representation of single and multidimensional arrays; Sprase arrays - lower and upper triangular matrices and Tridiagonal matrices with Vector Representation also.
Unit – II	Stacks and Queues	Introduction and primitive operations on stack; Stack application; Infix, postfix, prefix expressions; Evaluation of postfix expression; Conversion between prefix, infix and postfix, introduction and primitive operation on queues, D- queues and priority queues.
Unit– III	Lists	Introduction to linked lists; Sequential and linked lists, operations such as traversal, insertion, deletion searching, Two way lists and Use of headers
Unit– IV	Trees	Introduction and terminology; Traversal of binary trees; Recursive algorithms for tree operations such as traversal, insertion, deletion; Binary Search Tree
Unit – V	B-Trees	Introduction, The invention of B-Tree; Statement of the problem; Indexing with binary search trees; a better approach to tree indexes; B-Trees; working up from the bottom; Example for creating a B-Tree
Unit - VI		Sorting Techniques; Insertion sort, selection sort, merge sort, heap sort, searching Techniques: linear search, binary search and hashing

Referential Books:

1. E.Horowiz and S.Sahani, " Fundamentals of Data structures", Galgotia Book source Pvt. Ltd.2003
2. R.S.Salaria, " Data Structures & Algorithms" , Khanna Book Pblishing Co. (P) Ltd..,2002
3. Y.Langsam et. Al., " Data Structures using C and C++" , PHI, 1999

BCA-303 Computer Architecture & Assembly Language

Unit – I		Basic computer organization and design, Instructions and instruction codes, Timing and control/ instruction cycle, Register/ Types of register/ general purpose & special purpose registers/ index registers, Register transfer and micro operations/ register transfer instructions, Memory and memory function, Bus/ Data transfer instructions, Arithmetic logic micro-operations/ shift micro-operations, Input/ Output and interrupts, Memory reference instructions, Memory interfacing memory/ Cache memory.
Unit – II	Central Processing Unit	General Register Organization/ stacks organizations instruction formats, addressing modes, Data transfer and manipulation. Program control reduced computer, pipeline/ RISC/ CISC pipeline vector processing/ array processing. Arithmetic Algorithms: Integer multiplication using shift and add, Booth's algorithm, Integer division, Floating-point representations.
Unit– III	Computer Arithmetic	Addition, subtraction and multiplication algorithms, divisor algorithms. Floating point, arithmetic operations, decimal arithmetic operations, decimal arithmetic operations.
Unit– IV	Input - Output Organization	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 – V	Evaluation of Microprocessor	Overview of Intel 8085 to Intel Pentium processors Basic microprocessors, architecture and interface, internal architecture, external architecture memory and input/ output interface.
Unit – VI		Assembly language, Assembler, Assembly level instructions, macro, use of macros in I/C instructions, program loops, programming arithmetic and logic subroutines, Input-Output programming.

Referential Books:

1. Leventhal, L.A, "Introduction to Microprocessors", Prentice Hall of India
2. Mathur, A.P., "Introduction to Microprocessors" , Tata McGraw Hill
3. Rao,P.V.S., "Prospective in Computer Architechture" , Prentice Hall of India

BCA-304 Business Economics

Unit – I	The Scope and Method of Economics, the Economic Problem	Scarity & Choice, The Price Mechanism, Demand & Supply Equilibrium: The Concept of Elasticity and it's Applications.
	The Production Process	Output decisions - Revenues Costs and Profit Maximisation
	Laws of returns & Returns to Scale	Economics and Diseconomies of scale.
Unit – II	Market Structure	Equilibrium of a firm and Price, Output Determination under Perfect Competition Monopoly, Monoplastic Competition & Oligopoly
Unit– III	Macro Economic Concerns	Inflalation, Unemployment, Trade-Cycles, Circular Flow upto Four Sector Economy, Government in the Macro Economy: Fiscal Policy, Monetary Policy, Measuring national Income and Output
Unit– IV	The World Economy	- WTO, Globalisation, MNC's, Outsourcing, Foreign Capital in India, Trips, Groups of Twenty (G-20), Issues of dumping, Export-Import Policy 2004-2009

Referential Books:

1. Ahuja H.L., "Business Economics",S.Chand & Co., New Delhi, 2001
2. Ferfuson P.R., Rothchild, R and Fergusen G.J."Business Economics" Mac-millan, Hampshire, 1993
3. Karl E.Case & Ray C. fair , "Principles of Economics" , Pearson Education , Asia, 2000
4. Nellis, Joseph, Parker David, " The Essence of Business Economics",Prentice Hall, New Delhi, 1992.

BCA-305 Elements of Statistics

Unit – I	Population, Sample and Data Condensation	Definition and scope of statistics, concept of population and simple with Illustration, Raw data, attributes and variables, classification, frequency distribution, Cumulative frequency distribution.
Unit – II	Measures of Central Tendency	Concept of central Tendency, requirements of a good measures of central tendency, Arithmetic mean, Median, Mode, Harmonic Mean, Geometric mean for grouped and ungrouped data.
Unit– III	Measures of Dispersion	Concept of dispersion, Absolute and relative measure of dispersion, range variance, Standard deviation, Coefficient of variation
Unit– IV	Permutations and Combinations	Permutations of 'n' dissimilar objects taken 'r' at a time (with or without repetitions). ${}^{n}P_{r}$ = n!/(n-r) !(without proof). Combinations of 'r' objects taken from 'n' objects. ${}^{n}C_{r}$ = n!/(r!(n-r)!) (without proof) . Simple examples, Applications.
Unit – V	Sample space, Events and Probability	Experiments and random experiments, Ideas of deterministic and non-deterministic experiments; Definition of sample space, discrete sample space, events; Types of events, Union and intersections of two or more events, mutually exclusive events, Complementary event, Exhaustive event; Simple examples. Classical definition of probability, Addition theorem of probability without Proof (upto three events are expected). Definition of conditional probability Definition of independence of two events, simple numerical problems.
Unit – VI	Statistical Quality Control	Introduction, control limits, specification limits, tolerance limits, process and product control; Control charts for X and R; Control charts for number of defective {n-p chart} ,control charts for number of defects {c - chart}

Referential Books:

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

Course Code Course Name

BCA-306P Computer Laboratory and Practical Work of OOPS

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

BCA-307P Computer Laboratory and Practical Work of DS

Practical will be based on Paper Data Structure: Covers UNIT-III, UNIT-IV, UNIT-V, UNITVI of Syllabus

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COURSE CONTENT FOR SEMESTER – IV

BCA-401 Computer Graphics & Multimedia Application

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.

Unit– IV **Re**presenting 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 – V Introductory Concepts: Multimedia Definition, CD-ROM and the multimedia highway, Computer Animation (Design, types of animation, using different functions)

Unit – VI 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

Referential Books:

1. Foley, Van Dam, Feiner, Hughes, Computer Graphics Principles& practice,2000.
2. D.J. Gibbs & D.C. Tsichritzs: Multimedia programming Object Environment & Frame woork , 2000.
3. Ralf Skinmeiz and Klana Naharstedt, Multimedia: computing, Communication and Applications, pearson, 2001.
4. D.Haran & Baker. Computer Graphics Prentice Hall of India,1986

BCA-402 Operating System

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.

Unit– IV **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 – V **Information Management:** Introduction, A Simple File system, General Model of a File System, Symbolic File System, Basic File System, Access Control Verification, Logical File System.

Physical File system File - System Interface; File Concept, Access Methods, Directory Structure, Protection, Consistency Semantics File - System Implementation: File- System Structure, Allocation Methods, Free-Space Management

Referential Books:

1. Silbersachatz 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

BCA-403 Software Engineering

Unit – I **Software Engineering**: Definition and paradigms, A generic view of software are engineering.

Unit – II **Requirements Analysis:** Statement of system scope, isolation of top level processes and entitles 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.

Unit– IV **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 – V **Software Maintenance:** Maintenance as part of software evaluation, reasons for maintenance, types of maintenance (Perceptive, adoptive, corrective), designing for maintainability, techniques for maintenance.

Unit – VI Comprehensive examples using available software platforms/case tools, Configuration Management.

Referential 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.

BCA-404 Optimization Techniques

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.

Unit– IV **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-V **Job Sequencing:** Introduction, solution of sequencing problem Johnson s algorithm for n jobs through 2 machines.

Referential 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”
5. Hira & Gupta “Operation Research”

BCA-406 Mathematics III

Unit – I **COMPLEX VARIABLES:** Complex Number System, Algebra of Complex Numbers, Polar Form, Powers and Roots, Functions of Complex Variables, Elementary Functions, Inverse Trigonometric Function.

Unit – II **SEQUENCE, SERIES AND CONVERGENCE:** Sequence, Finite and Infinite Sequences, Monotonic Sequence, Bounded Sequence, Limit of a Sequence, Convergence of a Sequence, Series, Partial Sums, Convergent Series, Theorems on Convergence of Series (statement, alternating series, conditional convergent), Leibnitz Test, Limit Comparison Test, Ratio Test, Cauchy's Root Test, Convergence of Binomial and Logarithmic Series, Raabe's Test, Logarithmic Test, Cauchy's Integral Test (without proof)

Unit– III **VECTOR CALCULUS:** Differentiation of Vectors, Scalar and Vector Fields, Gradient, Directional Derivatives, Divergence and Curl and their Physical Meaning.

Unit– IV **FOURIER SERIES:** Periodic Functions, Fourier series, Fourier Series of Even and Odd Functions, Half Range Series.

Unit – V **ORDINARY DIFFERENTIAL EQUATIONS OF FIRST ORDER:** Variable- Separable Method, Homogeneous Differential Equations, Exact Differential Equations, Linear Differential Equations, Bernoulli's Differential Equations, Differential Equations of First Order and First Degree by Integrating Factor.

Unit – VI **ORDINARY DIFFERENTIAL EQUATIONS OF SECOND ORDER:** Homogenous Differential Equations with Constant Coefficients, Cases of Complex Roots and Repeated
Roots, Differential Operator, Solutions by Methods of Direct Formulae for Particular Integrals, Solution by Undetermined Coefficients, Cauchy Differential Equations, (only Real and Distinct Roots) Operator Method for Finding Particular Integrals, (Direct Formulae).

Referential Books:

1. A.B. Mathur and V.P. Jaggi, "Advanced Engineering Mathematics", Khanna Publishers, 1999.
2. 2. H.K. Dass, "Advanced Engineering Mathematics", S. Chand & Co., 9th Revised Ed.

Course Code Course Name

BCA-405 Computer Laboratory and Practical Work of Computer Graphics & Multimedia Application

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

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COURSE CONTENT FOR SEMESTER – V

BCA-501 Introduction to DBMS

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.

Unit– IV **Relational Data Model:** Relational model concepts, relational constraints, relational alzebra SQL: SQL queries, programming using SQL.

Unit – V **EER and ER to relational mapping:** Data base design using EER to relational language.

Unit – VI **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

Referential 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
3. A.K.Majumdar, P. Bhattacharya, "Database Management Systems", TMH, 1996.
4. Bipin Desai, "An Introduction to database systems", Galgotia Publications, 1991.

BCA-502 Java Programming and Dynamic Webpage Design

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.

Unit– IV **HTML:** use of commenting, headers, text styling, images, formatting text with <FONT>, special characters, horizontal rules, line breaks, table, forms, image maps, <META> tags, <FRAMESET> tags, file formats including image formats.

Unit – V **Java Servlets:** Introduction, HTTP Servlet Basics, The Servlet Lifecycle, Retrieving Information, Sending HTML Information, Session Tracking, Database Connectivity

Unit- VI **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.

Referential 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
5. Shelley Powers, "Dynamic Web Publishing" 2nd Ed. Techmedia, 1998
6. Hans Bergsten, "Java Server Pages", 3 rd Ed. O'reilly

BCA-503 Computer Network

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.

Unit – V **Transport and upper layers in OSI Model:** Transport layer functions, connection management, functions of session layers, presentation layer and application layer.

Referential Books:

1. A.S.Tanenbaum, "Computer Networks"; Pearson Education Asia, 4th Ed. 2003.
2. Behrouz A.Forouzan, "Data Communication and Networking", 3rd Ed. Tata MCGraw Hill, 2004.
3. William stallings, "Data and computer communications", Pearson education Asia, 7th Ed., 2002.

BCA-504 Numerical Methods

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, LaplaceEverett 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.

UNIT-V **Solution of Differential Equations:** Euler's method, Picard's method, Fourth-order Ranga - Kutta method.

Referential Books:

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

BCA-505P Minor Project

Evaluation will be based on Summer Training held after fourth semester and will be Conducted by the college committee only.

BCA-506P Viva-Voice on Summer Training

The viva will be conducted based on summer training of four weeks after the end of fourth Semester and will be Conducted by the college committee only.

BCA-507P 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

BCA-508P Computer Laboratory and Practical Work of Java Programming and Dynamic Webpage Design

Practical will be based on Paper Data Base Management System : on UINT-IV converging the concept from UNIT-II to UNIT-VI of Syllabus

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COURSE CONTENT FOR SEMESTER – VI

BCA-601 Computer Network Security

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: Kerveros, 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.

Unit– IV **Web Security:** Requirement, Secure Socket Layer, Transport Layer Security, and Secure Electronic Transactions.

Unit – V **Network Management Security:** Overview of SNMP Architecutre-SMMPVI1 Communication Facility, SNMPV3.

Unit – VI **System Security:** Intruders, Viruses and Relate Threats, Firewall Design Principles. Comprehensive examples using available software platforms/case tools, Configuration Management.

Referential Books:

1. W. Stallings, Networks Security Essentials: Application & Standards, Pearson Education, 2000.
2. W.Stallings, Cryptography and Network Security, Principles and Practice, Pearson Education, 2000.

BCA-602 Information System: Analysis Design & Implementation

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.

Unit– IV **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 – V **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.

Unit- VI **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.

Referential Books:

1. I.T.Haryszkiewycz, 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”
4. J.K.Whiten., L.D.Bentley, V.M.Beslow, “System Analysis and Design Methods”, (Galgotia Publications Pvt.Ltd.) 1994

BCA-603 E-Commerce

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.

Unit – V **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.

Referential Books:

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

BCA-604 Knowledge Management

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.

Referential Books:

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

BCA-605P Major Project

Evaluation will be based on held after fourth semester and will be Conducted by the college committee only.

BCA-606P Presentation/Seminar based on Major Project

Presentation/Seminar based on Major Project will be evaluated by external examiner only.