BACHELOR OF COMPUTER APPLICATION

(B.C.A.)

(THREE YEAR DEGREE COURSE)
## COURSE STRUCTURE

### FIRST YEAR

#### 1st SEMESTER

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Paper / Subject Name</th>
<th>External / Term Exam Max. Marks</th>
<th>Internal Assessment Max. Marks</th>
<th>Total Max. Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCA-S101</td>
<td>Computer Fundamental &amp; Office Automation</td>
<td>75</td>
<td>25</td>
<td>100</td>
</tr>
<tr>
<td>BCA-S102</td>
<td>Programming Principle &amp; Algorithm</td>
<td>75</td>
<td>25</td>
<td>100</td>
</tr>
<tr>
<td>BCA-S103</td>
<td>Principle of Management</td>
<td>75</td>
<td>25</td>
<td>100</td>
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<tr>
<td>BCA-S104</td>
<td>Business Communication</td>
<td>75</td>
<td>25</td>
<td>100</td>
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<tr>
<td>BCA-S105</td>
<td>Mathematics –I</td>
<td>75</td>
<td>25</td>
<td>100</td>
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<tr>
<td>BCA-S106 (a)</td>
<td>Computer Laboratory and Practical Work of Office Automation</td>
<td>-------</td>
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<td>50</td>
</tr>
<tr>
<td>BCA-S106 (b)</td>
<td>Computer Laboratory and Practical Work of Programming Principle &amp; Algorithm</td>
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</table>

**Total Marks of 1st Semester**: 600
# BACHELOR OF COMPUTER APPLICATION (B.C.A.)

## COURSE STRUCTURE

### FIRST YEAR

#### IInd SEMESTER

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Paper / Subject Name</th>
<th>External / Term Exam Max. Marks</th>
<th>Internal Assessment Max. Marks</th>
<th>Total Max. Marks</th>
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<tbody>
<tr>
<td>BCA-S107</td>
<td>C Programming</td>
<td>75</td>
<td>25</td>
<td>100</td>
</tr>
<tr>
<td>BCA-S108</td>
<td>Digital Electronics &amp; Computer Organization</td>
<td>75</td>
<td>25</td>
<td>100</td>
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<tr>
<td>BCA-S109</td>
<td>Organization Behavior</td>
<td>75</td>
<td>25</td>
<td>100</td>
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<tr>
<td>BCA-S110</td>
<td>Financial Accounting &amp; Management</td>
<td>75</td>
<td>25</td>
<td>100</td>
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<tr>
<td>BCA-S111</td>
<td>Mathematics –II</td>
<td>75</td>
<td>25</td>
<td>100</td>
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<tr>
<td>BCA-S112</td>
<td>Computer Laboratory and Practical Work of C Programming</td>
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**Total Marks of IInd Semester**  600
## BACHELOR OF COMPUTER APPLICATION (B.C.A.)

### COURSE STRUCTURE

#### SECOND YEAR

**IIIrd SEMESTER**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Paper / Subject Name</th>
<th>External / Term Exam Max. Marks</th>
<th>Internal Assessment Max. Marks</th>
<th>Total Max. Marks</th>
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</thead>
<tbody>
<tr>
<td>BCA-S201</td>
<td>Object Oriented Programming Using C++</td>
<td>75</td>
<td>25</td>
<td>100</td>
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<tr>
<td>BCA-S202</td>
<td>Data Structure Using C &amp; C++</td>
<td>75</td>
<td>25</td>
<td>100</td>
</tr>
<tr>
<td>BCA-S203</td>
<td>Computer Architecture &amp; Assembly Language</td>
<td>75</td>
<td>25</td>
<td>100</td>
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<tr>
<td>BCA-S204</td>
<td>Business Economics</td>
<td>75</td>
<td>25</td>
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<tr>
<td>BCA-S205</td>
<td>Elements of Statistics</td>
<td>75</td>
<td>25</td>
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<tr>
<td>BCA-S206 (a)</td>
<td>Computer Laboratory and Practical Work of OOPS</td>
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<tr>
<td>BCA-S206 (b)</td>
<td>Computer Laboratory and Practical Work of DS</td>
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**Total Marks of IIIrd Semester**  
600
# BACHELOR OF COMPUTER APPLICATION (B.C.A.)

## COURSE STRUCTURE

### SECOND YEAR

#### IVth SEMESTER

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Paper / Subject Name</th>
<th>External / Term Exam Max. Marks</th>
<th>Internal Assessment Max. Marks</th>
<th>Total Max. Marks</th>
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<tbody>
<tr>
<td>BCA-S207</td>
<td>Computer Graphics &amp; Multimedia Application</td>
<td>75</td>
<td>25</td>
<td>100</td>
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<tr>
<td>BCA-S208</td>
<td>Operating System</td>
<td>75</td>
<td>25</td>
<td>100</td>
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<tr>
<td>BCA-S209</td>
<td>Software Engineering</td>
<td>75</td>
<td>25</td>
<td>100</td>
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<tr>
<td>BCA-S210</td>
<td>Optimization Techniques</td>
<td>75</td>
<td>25</td>
<td>100</td>
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<tr>
<td>BCA-S211</td>
<td>Mathematics-III</td>
<td>75</td>
<td>25</td>
<td>100</td>
</tr>
<tr>
<td>BCA-S212</td>
<td>Computer Laboratory and Practical Work of Computer Graphics &amp; Multimedia Application</td>
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</tr>
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**Total Marks of IVth Semester** 600
# Course Structure

## Third Year

### Vth Semester

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Paper / Subject Name</th>
<th>External / Term Exam Max. Marks</th>
<th>Internal Assessment Max. Marks</th>
<th>Total Max. Marks</th>
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<tbody>
<tr>
<td>BCA-S301</td>
<td>Introduction to DBMS</td>
<td>75</td>
<td>25</td>
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<tr>
<td>BCA-S302</td>
<td>Java Programming and Dynamic Webpage Design</td>
<td>75</td>
<td>25</td>
<td>100</td>
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<tr>
<td>BCA-S303</td>
<td>Computer Network</td>
<td>75</td>
<td>25</td>
<td>100</td>
</tr>
<tr>
<td>BCA-S304</td>
<td>Numerical Methods</td>
<td>75</td>
<td>25</td>
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<tr>
<td>BCA-S305 (a)</td>
<td>Minor Project</td>
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<tr>
<td>BCA-S305 (b)</td>
<td>Viva-Voice on Summer Training</td>
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<tr>
<td>BCA-S306 (a)</td>
<td>Computer Laboratory and Practical Work of DBMS</td>
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<tr>
<td>BCA-S306 (b)</td>
<td>Computer Laboratory and Practical Work of Java Programming &amp; Dynamic Webpage Design</td>
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**Total Marks of Vth Semester** 600
BACHELOR OF COMPUTER APPLICATION (B.C.A.)

COURSE STRUCTURE

THIRD YEAR

VIth SEMESTER

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Paper / Subject Name</th>
<th>External / Term Exam Max. Marks</th>
<th>Internal Assessment Max. Marks</th>
<th>Total Max. Marks</th>
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<tbody>
<tr>
<td>BCA-S307</td>
<td>Computer Network Security</td>
<td>75</td>
<td>25</td>
<td>100</td>
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<tr>
<td>BCA-S308</td>
<td>Information System: Analysis Design &amp; Implementation</td>
<td>75</td>
<td>25</td>
<td>100</td>
</tr>
<tr>
<td>BCA-S309</td>
<td>E-Commerce</td>
<td>75</td>
<td>25</td>
<td>100</td>
</tr>
<tr>
<td>BCA-S310</td>
<td>Knowledge Management</td>
<td>75</td>
<td>25</td>
<td>100</td>
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<tr>
<td>BCA-S311</td>
<td>Major Project</td>
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<td>150</td>
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<tr>
<td>BCA-S312</td>
<td>Presentation/Seminar based on Major Project</td>
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<td>50</td>
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Total Marks of VIth Semester 600

First Semester 600 Marks
Second Semester 600 Marks
Third Semester 600 Marks
Fourth Semester 600 Marks
Fifth Semester 600 Marks
Sixth Semester 600 Marks

Total Marks = 3600

***********************
UNIT-I
Introduction to Computers

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
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
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.

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^n, 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
5. Pointers in C – Yashwant Kanetkar
6. How to solve it by Computer – R.G. Dromy Peter Norton’s Introduction to Computers – Tata McGHill
BACHELOR OF COMPUTER APPLICATION (B.C.A.)

DETAILED SYLLABUS

FIRST SEMESTER

COURSE CODE : BCA – S103

Principle of Management

UNIT-I
Nature of Management:

UNIT-II
Evolution of Management Thought:

UNIT-III
Functions of Management: Part-I

UNIT-IV
Functions of Management: Part-II
Motivation – Importance – theories
Leadership – Meaning – styles, qualities & function of leader
UNIT – V

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:
5. Business Organization & Management – Dr. Y.K.Bhushan
6. Management: Concept and Strategies By J.S. Chandan, Vikas Publishing
8. Business organization and Management by Talloo by Tata McGraw Hill
BACHELOR OF COMPUTER APPLICATION (B.C.A.)

DETAILED SYLLABUS

FIRST SEMESTER

COURSE CODE : BCA – S104

Business Communication

UNIT-I
Means of Communication:

UNIT-II
Types of Communication: Oral Communication:

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:
Word Processor – Telex – Facsimile (Fax) – E-mail – Voice mail – Internet – Multimedia – Teleconferencing – Mobile Phone Conversation – Video Conferencing – SMS – Telephone Answering Machine – Advantages and limitations of these types.

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

Referential Books:
UNIT-I
DETERMINANTS:

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.

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:**
BACHELOR OF COMPUTER APPLICATION (B.C.A.)

DETAILED SYLLABUS

FIRST SEMESTER

COURSE CODE : BCA – S106 (a)

Computer Laboratory & Practical Work of Office Automation

Practical will be based on Paper Office Automation:

Covers UNIT-III, UNIT-IV, UNIT-V, UNIT-VI of Syllabus
BACHELOR OF COMPUTER APPLICATION (B.C.A.)

DETAILED SYLLABUS

FIRST SEMESTER

COURSE CODE : BCA – S106 (b)

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
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.

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(), frewind(); 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
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 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.

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
<table>
<thead>
<tr>
<th></th>
<th>Title</th>
<th>Author/Ed.</th>
</tr>
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<tbody>
<tr>
<td>3.</td>
<td>Digital Electronics (TMH) 1998</td>
<td>Malvino and Leach</td>
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<tr>
<td>5.</td>
<td>Digital fundamentals (Universal Book Stall) 1998</td>
<td>Floyd, L.Thomas</td>
</tr>
</tbody>
</table>
UNIT-I  
**Fundamentals of Organizational Behaviour**  

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:
3. Organizational Behavior – By Fred Luthans
4. Organizational Behavior – By Super Robbins
5. Organizational Behavior – Anjali Ghanekar
7. Organizational Behavior through Indian Philosophy, By N.M.Mishra, Hikalaya Publication House
BACHELOR OF COMPUTER APPLICATION (B.C.A.)

DETAILED SYLLABUS

SECOND SEMSTER

COURSE CODE : BCA – S110

Financial Accounting & Management

UNIT-I

UNIT-II

UNIT-III

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
UNIT-VI
Cash Management, Inventory Management and Receivables Management.

Referential Books:
BACHELOR OF COMPUTER APPLICATION (B.C.A.)

DETAILED SYLLABUS

SECOND SEMSTER

COURSE CODE : BCA – S111

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

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:
BACHELOR OF COMPUTER APPLICATION (B.C.A.)

DETAILED SYLLABUS

SECOND SEMESTER

COURSE CODE : BCA – S112

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
BACHELOR OF COMPUTER APPLICATION (B.C.A.)

DETAILED SYLLABUS

THIRD SEMESTER

COURSE CODE: BCA – S201

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, Parameteric Polymorphism

UNIT-IV Generic function
Template function, function name overloading, Overriding inheritance methods, Run time polymorphism, Multiple Inheritance.

UNIT-V
Files and Exception Handling
Streams and files, Namespaces, Exception handling, Generic Classes

Referential Books:
BACHELOR OF COMPUTER APPLICATION (B.C.A.)

DETAILED SYLLABUS

THIRD SEMSTER

COURSE CODE : BCA – S202

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:
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.

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
BACHELOR OF COMPUTER APPLICATION (B.C.A.)

DETAILED SYLLABUS

THIRD SEMESTER

COURSE CODE : BCA – S204

Business Economics

UNIT-I
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

Referential Books:
2. Ferfuson P.R., Rothchild, R and Fergusen G.J.”Business Economics” Mac-millan, Hampshire, 1993

BACHELOR OF COMPUTER APPLICATION (B.C.A.)

DETAILED SYLLABUS

THIRD SEMESTER

COURSE CODE : BCA – S205

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). nPr = n!/(n-r) !(without proof). Combinations of ‘r’ objects taken from ‘n’ objects. nCr = 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:
3. Montogomery D.C. – Statistical Quality Control - John Welly and Sons
BACHELOR OF COMPUTER APPLICATION (B.C.A.)

DETAILED SYLLABUS

THIRD SEMESTER

COURSE CODE : BCA – S206 (a)

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
BACHELOR OF COMPUTER APPLICATION (B.C.A.)

DETAILED SYLLABUS

THIRD SEMESTER

COURSE CODE: BCA – S206 (b)

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
UNIT-I

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

UNIT-IV
Representing Curves & Surfaces
Polygon meshes parametric, Cubic Curves, Quadric Surface;
Solid Modeling
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:
BACHELOR OF COMPUTER APPLICATION (B.C.A.)

DETAILED SYLLABUS

FOURTH SEMESTER

COURSE CODE : BCA – S208

Operating System

UNIT-I

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

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,

UNIT-V

Referential Books:
BACHELOR OF COMPUTER APPLICATION (B.C.A.)

DETAILED SYLLABUS

FOURTH SEMESTER

COURSE CODE : BCA – S209

Software Engineering

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.

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:**
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”
4. S.D. Sharma “Operation Research”
5. Hira & Gupta “Operation Research”
BACHELOR OF COMPUTER APPLICATION (B.C.A.)

DETAILED SYLLABUS

FOURTH SEMESTER

COURSE CODE : BCA – S211

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


Referential Books:
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
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

Referential Books:


BACHELOR OF COMPUTER APPLICATION (B.C.A.)

DETAILED SYLLABUS

FIFTH SEMSTER

COURSE CODE : BCA – S302

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 \texttt{<FONT>}, special characters, horizontal rules, line breaks, table, forms, image maps, \texttt{<META>} tags, \texttt{<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
Referential Books:
1. Patrick Naughton and Herbertz Schildt, “Java-2 The Complete Reference” 199, TMH.
3. Ivor Horton, “Beginning Java-2” SPD Publication
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:**
BACHELOR OF COMPUTER APPLICATION (B.C.A.)

DETAILED SYLLABUS

FIFTH SEMSTER

COURSE CODE : BCA – S304

Numerical Methods

UNIT-I


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.

UNIT-V


Referential Books:

1. Scarbourough, “Numerical Analysis”.
BACHELOR OF COMPUTER APPLICATION (B.C.A.)

DETAILED SYLLABUS

FIFTH SEMESTER

COURSE CODE : BCA – S305(a)

Minor Project

Evaluation will be based on Summer Training held after fourth semester and will be Conducted by the college committee only.
BACHELOR OF COMPUTER APPLICATION (B.C.A.)

DETAILED SYLLABUS

FIFTH SEMSTER

COURSE CODE : BCA – S305(b)

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.
BACHELOR OF COMPUTER APPLICATION (B.C.A.)

DETAILED SYLLABUS

FIFTH SEMESTER

COURSE CODE : BCA – S306(a)

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
BACHELOR OF COMPUTER APPLICATION (B.C.A.)

DETAILED SYLLABUS

FIFTH SEMSTER

COURSE CODE : BCA – S306(b)

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
BACHELOR OF COMPUTER APPLICATION (B.C.A.)

DETAILED SYLLABUS

SIXTH SEMSTER

COURSE CODE : BCA – S307

Computer Network Security

UNIT-I

UNIT-II
Network Security:

UNIT-III

UNIT-IV

UNIT-V

UNIT-VI
Referential Books:
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:**
UNIT-I


UNIT-II

UNIT-III
services, Applications of Extranets, Business Models of Extranet Applications, Managerial Issues.


**UNIT-IV**


**UNIT-V**


**Referential Books:**
BACHELOR OF COMPUTER APPLICATION (B.C.A.)

DETAILED SYLLABUS

SIXTH SEMESTER

COURSE CODE : BCA – S310

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
3. Han, Jiawei, Kamber, Michelinal, “ Data Mining Concepts & Techniques”, Harcourt India, 2001
BACHELOR OF COMPUTER APPLICATION (B.C.A.)

DETAILED SYLLABUS

SIXTH SEMESTER

COURSE CODE : BCA – S311

Major Project

Evaluation will be based on held after fourth semester and will be Conducted by the college committee only.
Presentation/Seminar based on Major Project

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