

## Bachelor of Computer Applications Semester – wise breakup of course

### • Semester-I<sup>st</sup>

Course Code	Course Name	L	T	P	C
BCA-S101T	Computer Fundamental & Office Automation	3	0	0	3
BCA-S102T	Programming Principle & Algorithm	3	0	0	3
BCA-S103	Principle of Management	4	0	0	4
BCA-S104	Business Communication	3	1	0	4
BCA-S105	Mathematics –I	4	0	0	4
BCA-S101P	Computer Laboratory and Practical Work of Office Automation	0	0	3	2
BCA-S102P	Computer Laboratory and Practical Work of Programming Principle & Algorithm	0	0	3	2

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### • Semester-II<sup>nd</sup>

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

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• **Semester-III<sup>rd</sup>**

<b>Course Code</b>	<b>Course Name</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
BCA-S201T	Object Oriented Programming Using C++	3	0	0	3
BCA-S202T	Data Structure Using C & C++	3	0	0	3
BCA-S203	Computer Architecture & Assembly Language	3	1	0	4
BCA-S204	Business Economics	3	1	0	4
BCA-S205	Elements of Statistics	3	1	0	4
BCA-S201P	Computer Laboratory and Practical Work of OOPS	0	0	3	2
BCA-S202P	Computer Laboratory and Practical Work of DS	0	0	3	2
					<b>22</b>

• **Semester- IV<sup>th</sup>**

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

• Semester-V<sup>th</sup>

Course Code	Course Name	L	T	P	C
BCA-S301T	Introduction to DBMS	3	0	0	3
BCA-S302T	Java Programming and Dynamic Webpage Design	3	0	0	3
BCA-S303	Computer Network	3	1	0	4
BCA-S304	Numerical Methods	3	1	0	4
BCA-S305	Minor Project	0	1	2	2
BCA-S306	Viva-Voice on Summer Training	0	0	2	1
BCA-S301P	Computer Laboratory and Practical Work of DBMS	0	0	3	2
BCA-S302P	Computer Laboratory and Practical Work of Java Programming & Dynamic Webpage Design	0	0	3	2
					<b>21</b>

• Semester-VI<sup>th</sup>

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

# Bachelor of Computer Applications

## • Semester-I<sup>st</sup>

Course Code	Course Name	External	Internal	Total	L	T	P	C
BCA-S101T	Computer Fundamental & Office Automation	75	25	100	3	0	0	3
BCA-S102T	Programming Principle & Algorithm	75	25	100	3	0	0	3
BCA-S103	Principle of Management	75	25	100	4	0	0	4
BCA-S104	Business Communication	75	25	100	3	1	0	4
BCA-S105	Mathematics -I	75	25	100	4	0	0	4
BCA-S101P	Computer Laboratory and Practical Work of Office Automation	-	-	50	0	0	3	2
BCA-S102P	Computer Laboratory and Practical Work of Programming Principle & Algorithm	-	-	50	0	0	3	2
				600				22

## • Semester-II<sup>nd</sup>

Course Code	Course Name	External	Internal	Total	L	T	P	C
BCA-S106T	C Programming	75	25	100	3	0	0	3
BCA-S107	Digital Electronics & Computer Organization	75	25	100	3	1	0	4
BCA-S108	Organization Behaviour	75	25	100	4	0	0	4
BCA-S109	Financial Accounting & Management	75	25	100	3	1	0	4
BCA-S110	Mathematics II	75	25	100	4	0	0	4
BCA-S106P	Computer Laboratory and Practical Work of C Programming	-	-	100	0	0	6	3
				600				22

• **Semester-III<sup>rd</sup>**

Course Code	Course Name	External	Internal	Total	L	T	P	C
BCA-S201T	Object Oriented Programming Using C++	75	25	100	3	0	0	3
BCA-S202T	Data Structure Using C & C++	75	25	100	3	0	0	3
BCA-S203	Computer Architecture & Assembly Language	75	25	100	3	1	0	4
BCA-S204	Business Economics	75	25	100	3	1	0	4
BCA-S205	Elements of Statistics	75	25	100	3	1	0	4
BCA-S201P	Computer Laboratory and Practical Work of OOPS	-	-	50	0	0	3	2
BCA-S202P	Computer Laboratory and Practical Work of DS	-	-	50	0	0	3	2
				600				22 22

• **Semester-IV<sup>th</sup>**

Course Code	Course Name	External	Internal	Total	L	T	P	C
BCA-S206T	Computer Graphics & Multimedia Application	75	25	100	3	0	0	3
BCA-S207	Operating System	75	25	100	3	1	0	4
BCA-S208	Software Engineering	75	25	100	3	1	0	4
BCA-S209	Optimization Techniques	75	25	100	3	1	0	4
BCA-S210	Mathematics-III	75	25	100	4	0	0	4
BCA-S206P	Computer Laboratory and Practical Work of Computer Graphics & Multimedia Application	-	-	100	0	0	6	3
				600				22

• **Semester-V<sup>th</sup>**

Course Code	Course Name	External	Internal	Total	L	T	P	C
BCA-S301T	Introduction to DBMS	75	25	100	3	0	0	3
BCA-S302T	Java Programming and Dynamic Webpage Design	75	25	100	3	0	0	3
BCA-S303	Computer Network	75	25	100	3	1	0	4
BCA-S304	Numerical Methods	75	25	100	3	1	0	4
BCA-S305	Minor Project	-	-	50	0	1	2	2
BCA-S306	Viva-Voce on Summer Training	-	-	50	0	0	2	1
BCA-S301P	Computer Laboratory and Practical Work of DBMS	-	-	50	0	0	3	2
BCA-S302P	Computer Laboratory and Practical Work of Java Programming & Dynamic Webpage Design	-	-	50	0	0	3	2
				600				21

• **Semester-VI<sup>th</sup>**

Course Code	Course Name	External	Internal	Total	L	T	P	C
BCA-S307	Computer Network Security	75	25	100	4	0	0	4
BCA-S308	Information System: Analysis Design & Implementation	75	25	100	3	1	0	4
BCA-S309	E-Commerce	75	25	100	4	0	0	4
BCA-S310	Knowledge Management	75	25	100	3	1	0	4
BCA-S311	Major Project	-	-	150	0	3	6	5
BCA-S312	Presentation/Seminar based on Major Project			50				1
				600				22

# Bachelor of Computer Applications

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

## UNIT-I

### Introduction to Computers

Introduction, Characteristics of Computers, Block diagram of computer.

Types of computers and features, Mini Computers, Micro Computers, Mainframe Computers, Super Computers. Types of Programming Languages (Machine Languages, Assembly Languages, High Level Languages). Data Organization, Drives, Files, Directories.

Types of Memory (Primary And Secondary) RAM, ROM, PROM, EPROM, Secondary Storage Devices (FD, CD, HD, Pen drive) I/O Devices (Scanners, Plotters, LCD, Plasma Display),

Number Systems: Introduction to Binary, Octal, Hexadecimal system -Conversion, Simple Addition, Subtraction, Multiplication.

## UNIT-II

### Algorithm and Flowcharts

Algorithm: Definition, Characteristics, Advantages and disadvantages, Examples

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

## UNIT-III

### Operating System and Services in O.S.

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

## 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 applications, MS- Power Point.

### Reference 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 Tanenbaum Tata McGraw Hill Publication

# Bachelor of Computer Applications

Course Code	Course Name	L	T	P	C
BCA-S102T	Programming Principles & Algorithms	3	0	0	3

## 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

### Built in Operators and functions

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 (Trial & Error, Brain Storming, Divide & Conquer)

Steps in problem solving (Define Problem, Analyze Problem, Explore Solution) Algorithms and Flowcharts

(Definitions, Symbols), Characteristics of an algorithm, Conditionals in pseudo-code, Loops in pseudo code

Time complexity: Big-Oh notation, efficiency Simple Examples: Algorithms and flowcharts (Real Life Examples)

## UNIT-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,  ${}^n C_r$ , 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.

### Reference 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: Introduction to Computers – Tata McGraw Hill



# Bachelor of Computer Applications

<b>Course Code</b>	<b>Course Name</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
BCA-S103	Principles of Management	4	0	0	4

## UNIT-I

### **Nature of Management:**

Meaning, Definition, 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

### **Reference Books:**

1. Essential of Management – Horold Koontz and Itainz Weibrich- McGraw-Hill’s 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.Prasad,, 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, Tata McGraw Hill
9. Business Environment and Policy – A book on Strategic Management/ Corporate Planning by Francis Cherunilam Himalaya Publishing House 2001 Edition

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<b>Course Code</b>	<b>Course Name</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>BCA-S104</b>	<b>Business Communication</b>	<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>

## 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:

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 of communication.

#### Topics Prescribed for workshop/skill lab

Group Discussion, Mock Interview, Decision Making in a Group

### Reference 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, 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 Private Limited, New Delhi.
- 8) Modern Business Correspondence – L.Gartside – The English Language Book Society and Macdonald and Evans Ltd.
- 9) Business Communication – M.Balasubrahmanyam –Vani Education Books.
- 10) Creating a Successful CV –Simon Howard – Dorling Kindersley.

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<b>Course Code</b>	<b>Course Name</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
BCA-S105	Mathematics –I	4	0	0	4

## UNIT-I

### DETERMINANTS:

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

## UNIT-II

### LIMITS & CONTINUITY:

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

## UNIT-III

### DIFFERENTIATION:

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

## 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.

### Reference Books :

1. B.S. Grewal, "Elementary Engineering Mathematics", 34th Ed., 1998.
2. Shanti Narayan, "Integral Calculus", S. Chand & Company, 1999
3. H.K. Dass, "Advanced Engineering Mathematics", S. Chand & Company, 9th Revised Edition, 2001.
4. Shanti Narayan, "Differential Calculus ", S.Chand & Company, 1998.

# Bachelor of Computer Applications

<b>Course Code</b>	<b>Course Name</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>BCA-S101P</b>	<b>Computer Laboratory and Practical Work of Office Automation</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>2</b>

**Practical will be based on Paper Office Automation: Covers UNIT-III, UNIT-IV, UNIT-V, UNIT-VI of Syllabus**

# Bachelor of Computer Applications

<b>Course Code</b>	<b>Course Name</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>BCA-S102P</b>	<b>Computer Laboratory and Practical Work of Programming Principles &amp; Algorithm</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>2</b>

**Practical will be based on Paper Programming Principles & Algorithms: Covers UNIT-III, UNIT-IV, UNIT-V, UNIT-VI of Syllabus.**

# Bachelor of Computer Applications

<b>Course Code</b>	<b>Course Name</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>BCA-S106T</b>	<b>C Programming</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

## 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(), fwind(); Using text files: fgetc(), fputc(), fscanf()

### Command line arguments

### Reference Books:

1. Let us C-Yashwant Kanetkar.
2. Programming in C-Balguruswamy
3. The C programming Language – Dennis Ritchie
4. Structured programming approach using C-Forouzah & Ceilberg Thomson learning Publication.

# Bachelor of Computer Applications

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

## UNIT-I

### Logic gates and circuit

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

## UNIT-II

### Combinational Building Blocks

Multiplexors; 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.

### Reference 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, Singapore) : Hamacher, Vranesic and Zaky

# Bachelor of Computer Applications

<b>Course Code</b>	<b>Course Name</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>BCA-S108</b>	<b>Organizational Behaviour</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>4</b>

## 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, McGregor'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 Traits, 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.

### **Reference 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, 12<sup>th</sup> 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, Himalaya Publication House



# Bachelor of Computer Applications

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

## UNIT-I

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

## UNIT-II

Basics of accounting – Capital & Revenue items, Application of Computer in Accounting, Double Entry System, Introduction to Journal, Ledger and Procedure for Recording and Posting, Introduction to Trial 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 problems, Cash flow analysis, Concepts, uses, preparation of cash flow statement- simple problems, 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.

## Reference Books:

1. Maheshwari & Maheshwari, “An Introduction to Accountancy”, 8<sup>th</sup> 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”, 11<sup>th</sup> Edition, Sultan Chand & Sons, 2001.
5. Shukla and Grewal, “Advanced Accounts”, 14<sup>th</sup> Edition, Sultan Chand & Sons.

# Bachelor of Computer Applications

<b>Course Code</b>	<b>Course Name</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>BCA-S110</b>	<b>Mathematics II</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>4</b>

## 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 Relations, Function: Domain and Range, Onto, Into and One to One Functions, Composite and Inverse Functions, Introduction to Trigonometric, Logarithmic and Exponential Functions.

## UNIT-III

### PARTIAL ORDER RELATIONS AND LATTICES

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

## UNIT-IV

### FUNCTIONS OF SEVERAL VARIABLES

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

## 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.

### Reference Books:

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

# Bachelor of Computer Applications

Course Code	Course Name	L	T	P	C
BCA-S106P	Computer Laboratory and Practical Work of C Programming	0	0	6	3

**Practical will be based on Paper 'Programming Principles & Algorithms': Covers UNIT-III, UNIT-IV, UNIT-V, UNIT-VI of Syllabus**

# Bachelor of Computer Applications

<b>Course Code</b>	<b>Course Name</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
BCA-S201T	Object Oriented Programming Using C++	3	0	0	3

## UNIT-I

### Introduction

Introducing Object – Oriented Approach, Relating to other paradigms {Functional, Data decomposition}.

### Basic terms and ideas

Abstraction, Encapsulation, Inheritance, Polymorphism, Review of C, Difference between C and C++ - cin, cout, new, delete, operators.

## UNIT-II

### Classes and Objects

Encapsulation, information hiding, abstract data types, Object & classes, attributes, methods, C++ class declaration, State identity and behaviour of an object, Constructors and destructors, instantiation of objects, Default parameter value, object types, C++ garbage collection, dynamic memory allocation, Metaclass / abstract classes.

## UNIT-III

### Inheritance and Polymorphism

Inheritance, Class hierarchy, derivation – public, private & protected, Aggregation, composition vs classification, hierarchies, Polymorphism, Categorization of polymorphism techniques, Method polymorphism, Polymorphism by parameter, Operator overloading, 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

### Reference Books:

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

# Bachelor of Computer Applications

<b>Course Code</b>	<b>Course Name</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
BCA-S202T	Data Structure Using C & C++	3	0	0	3

## UNIT-I

### Introduction to Data Structure and its Characteristics

#### Array

Representation of single and multidimensional arrays; Sparse arrays – lower and upper triangular matrices and Tridiagonal matrices with Vector Representation also.

## UNIT-II

### Stacks and Queues

Introduction and primitive operations on stack; Stack application; Infix, postfix, prefix expressions; Evaluation of postfix expression; Conversion between prefix, infix and postfix, introduction and primitive operation on queues, D- queues and priority queues.

## UNIT-III

### Lists

Introduction to linked lists; Sequential and linked lists, operations such as traversal, insertion, deletion searching, two way lists and Use of headers

## 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

### Reference Books:

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

# Bachelor of Computer Applications

<b>Course Code</b>	<b>Course Name</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
BCA-S203	Computer Architecture & Assembly Language	3	1	0	4

## UNIT-I

Basic computer organization and design, Instructions and instruction codes, Timing and control/ instruction cycle, Register/ Types of register/ general purpose & special purpose registers/ index registers, Register transfer and micro operations/ register transfer instructions, Memory and memory function, Bus/ Data transfer instructions, Arithmetic logic micro-operations/ shift micro-operations, Input/ Output and interrupts, Memory reference instructions, Memory interfacing , 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.

## 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.

### Reference Books:

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

# Bachelor of Computer Applications

Course Code      Course Name  
BCA-S204        Business Economics

L   T   P   C  
3   1   0   4

## UNIT-I

**The Scope and Method of Economics, the Economic Problem:** Scarcity & Choice, The Price Mechanism, Demand & Supply Equilibrium: The Concept of Elasticity and it's Applications.

**The Production Process:** output decisions – Revenues Costs and Profit Maximisation

**Laws of returns & Returns to Scale:** Economics and Diseconomies of scale.

## UNIT-II

**Market Structure:** Equilibrium of a firm and Price, Output Determination under Perfect Competition Monopoly, Monopolistic Competition & Oligopoly

## UNIT-III

### Macro Economic Concerns

Inflation, Unemployment, Trade-Cycles, Circular Flow up to 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

### Reference Books:

1. Ahuja H.L., "Business Economics", S.Chand & Co., New Delhi, 2001
2. Ferguson P.R., Rothschild, R and Ferguson G.J."Business Economics" Mac-Milan, 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.

# Bachelor of Computer Applications

Course Code  
BCA-S205

Course Name  
Elements of Statistics

L	T	P	C
3	1	0	4

## UNIT-I

### Population, Sample and Data Condensation

Definition and scope of statistics, concept of population and sample with Illustration, Raw data, attributes and variables, classification, frequency distribution, Cumulative frequency distribution.

## UNIT-II

### Measures of Central Tendency

Concept of central Tendency, requirements of 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 (up to 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}

### Reference Books:

1. S.C.Gupta - Fundamentals of Statistics - Sultan Chand & sons , Delhi.
2. D.N.Elhance - Fundamentals of statistics - Kitab Mahal, Allahabad.
3. Montgomery D.C. – Statistical Quality Control - John Wiley 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. New York.
6. Gupta S.P. – Statistical Methods, Sultan Chand and Sons New Delhi



# Bachelor of Computer Applications

Course Code	Course Name	L	T	P	C
BCA-S201P	Computer Laboratory and Practical Work of OOPS	0	0	3	2

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

# Bachelor of Computer Applications

<b>Course Code</b>	<b>Course Name</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>BCA-S202P</b>	<b>Computer Laboratory and Practical Work of DS</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>2</b>

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

# Bachelor of Computer Applications

<b>Course Code</b>	<b>Course Name</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
BCA-S206T	Computer Graphics & Multimedia Applications	3	0	0	3

## UNIT-I

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

## UNIT-II

Hardcopy Technologies, Display Technologies, Raster-Scan Display System, Video Controller, Random-Scan Display processor, Input Devices for Operator Interaction, Image Scanners and 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

### Representing Curves & Surfaces

Polygon meshes parametric, Cubic Curves, Quadric Surface;

### Solid Modelling

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

### Reference Books:

1. Foley, Van Dam, Feiner, Hughes, Computer Graphics Principles& practice,2000.
2. D.J. Gibbs & D.C. Tschritz: Multimedia programming Object Environment& Frame work , 2000
3. Ralf Skinmeiz and Klana Naharstedt, Multimedia: computing, Communication and Applications, Pearson, 2001
4. Hearn & Baker. Computer Graphics Prentice Hall of India, 1986
- 5, Procedural Elements of Computer Graphics : Rogers , TMH Publishing Company
6. Mathematical Elements of Computer Graphics: Rogers, TMH Publishing Company

# Bachelor of Computer Applications

<b>Course Code</b>	<b>Course Name</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
BCA-S207	Operating System	3	1	0	4

## UNIT-I

Introduction, What is an operating system, Simple Batch Systems, Multi-programmed Batch systems, Time-Sharing Systems, Personal – Computer Systems, Parallel systems, Distributed systems, Real- Time Systems.

**Memory Management:** Background, Logical versus physical Address space, swapping, Contiguous allocation, Paging, Segmentation

**Virtual Memory:** Demand Paging, Page Replacement, Page- replacement Algorithms, Performance of Demand Paging, Allocation of Frames, Thrashing, Other Considerations

## UNIT-II

**Processes:** Process Concept, Process Scheduling, Operation on Processes

**CPU Scheduling:** Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Multiple – Processor Scheduling.

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

## UNIT-III

**Deadlocks:** System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock

## 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

## Reference Books:

1. Silberschatz and Galvin, “Operating System Concepts”, Person, 5<sup>th</sup> Ed. 2001
2. Madnick E., Donovan J., “Operating Systems:”, Tata McGraw Hill,2001
3. Tanenbaum, “Operating Systems”, PHI, 4<sup>th</sup> Edition, 2000
4. Dietel, “Operating Systems”, TMH.

# Bachelor of Computer Applications

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

## UNIT-I

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

## UNIT-II

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

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

## UNIT-III

**Designing Software Solutions:** Refining the software Specification; Application of fundamental design concept for data, architectural and procedural designs using software blue print methodology and object oriented design paradigm; Creating design document: Review of conformance to software requirements and quality.

## 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, adaptive, corrective), designing for maintainability, techniques for maintenance.

## UNIT-VI

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

## Reference Books:

1. K.K.Agrawal & Yogesh Singh “Software engineering”, 2<sup>nd</sup> 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.
4. Software Engineering : P. Jalote , Narosa Publishing House

# Bachelor of Computer Applications

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

## UNIT-I

### Linear programming

Central Problem of linear Programming ,various definitions including 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 shortage, having production rate infinite and finite.

## UNIT-V

### Job Sequencing

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

### Reference Books:

1. Gillet B.E. "Introduction to Operation Research"
2. Taha,H.A. "Operation Research - An Introduction"
3. Kanti Swaroop "Operation Research"
4. S.D.Sharma "Operation Research"
5. Hira & Gupta "Operation Research"

## Bachelor of Computer Applications

Course Code	Course Name	L	T	P	C
BCA-S210	Mathematics-III	4	0	0	4

### 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).

### Reference Books:

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

## **Bachelor of Computer Applications**

<b>Course Code</b>	<b>Course Name</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>BCA-S206P</b>	<b>Computer Laboratory and Practical Work of Computer Graphics &amp; Multimedia Application</b>	<b>0</b>	<b>0</b>	<b>6</b>	<b>3</b>

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



# Bachelor of Computer Applications

<b>Course Code</b>	<b>Course Name</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
BCA-S301T	Introduction to DBMS	3	0	0	3

## UNIT-I

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

## UNIT-II

**E-R Modelling:** Entity types, Entity set, attribute and key, relationships, relation types, roles and structural constraints, weak entities, enhanced E-R and object modelling, 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 algebra

**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 3<sup>rd</sup> normal form.

Concurrency Control: Transaction processing, locking techniques and associated, database recovery, security and authorization. Recovery Techniques, Database Security

## Reference Books:

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

# Bachelor of Computer Applications

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

## UNIT-I

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

## UNIT-II

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

## UNIT-III

Networking (datagram socket and TCP/IP based server socket) event handling, JDBC: Introduction, Drivers, Establishing Connection, Connection Pooling.

## 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 Servlets Basics, The Servlets 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.

## Reference Books:

1. Patrick Naughton and Herbert Schildt, "Java-2 The Complete Reference" 199, TMH.
2. Shelley Powers, "Dynamic Web Publishing" 2<sup>nd</sup> Ed. Techmedia, 1998.
3. Ivor Horton, "Beginning Java-2" SPD Publication
4. Jason Hunter, "Java Servlets Programming" O'Reilly
5. Shelley Powers, "Dynamic Web Publishing" 2<sup>nd</sup> Ed. Techmedia, 1998
6. Hans Bergsten, "Java Server Pages", 3<sup>rd</sup> Ed. O'Reilly

# Bachelor of Computer Applications

<b>Course Code</b>	<b>Course Name</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
BCA-S303	Computer Networks	3	1	0	4

## UNIT-I

**Basic Concepts:** Components of data communication, distributed processing, standards and organizations. Line configuration, topology, Transmission mode, and categories of networks.

**OSI and TCP/IP Models:** Layers and their functions, comparison of models.

Digital Transmission: Interfaces and Modems: DTE-DCE Interface, Modems, Cable modems.

## UNIT-II

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

## UNIT-III

**Telephony:** Multiplexing, error detection and correction: Many to one, One to many, WDM, TDM, FDM, Circuit switching, packet switching and message switching.

Data link control protocols: Line discipline, flow control, error control, synchronous and asynchronous protocols, character and bit oriented protocols, Link access procedures.

**Point to point controls:** Transmission states, PPP layers, LCP, Authentication, NCP.

**ISDN:** Services, Historical outline, subscriber's access, ISDN Layers and broadcast ISDN.

## UNIT-IV

**Devices:** Repeaters, bridges, gateways, routers, The Network Layer; Design issues, Routing algorithms, Congestion control Algorithms, Quality of service, Internetworking, Network-Layer in the internet.

## UNIT-V

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

## Reference Books:

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

# Bachelor of Computer Applications

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

## UNIT-I

**Roots of Equations:** Bisection Method, False Position Method, Newton's Rapheson 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, Sterling 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,s iterative method.

## UNIT-V

**Solution of Differential Equations:** Euler's method, Picard's method, Fourth-order Runge – Kutta method.

### Reference Books:

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

## **Bachelor of Computer Applications**

<b>Course Code</b>	<b>Course Name</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>BCA-S305</b>	<b>Minor Project</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>2</b>

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

## **Bachelor of Computer Applications**

<b>Course Code</b>	<b>Course Name</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>BCA-S306</b>	<b>Viva-Voce on Summer Training</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>1</b>

**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 Applications**

<b>Course Code</b>	<b>Course Name</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>BCA-S301P</b>	<b>Computer Laboratory and Practical Work of DBMS</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>2</b>

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

## **Bachelor of Computer Applications**

<b>Course Code</b>	<b>Course Name</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>BCA-S302P</b>	<b>Computer Laboratory and Practical Work of Java Programming and Dynamic Webpage Design</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>2</b>

**Practical will be based on the Paper Java Programming & Website Design based on Whole Syllabus**



# Bachelor of Computer Applications

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

## UNIT-I

**Introduction:** Attack, Services and Mechanism, Model for Internetwork Security.

Cryptography: Notion of Plain Text, Encryption, Key, Cipher Text, Decryption and cryptanalysis; Public Key Encryption, digital Signatures and Authentication.

## UNIT-II

**Network Security:**

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

## UNIT-III

**IP security Architecture:** Overview, Authentication header, Encapsulating Security Pay Load combining Security Associations, Key Management.

## UNIT-IV

**Web Security:** Requirement, Secure Sockets Layer, Transport Layer Security, and Secure Electronic Transactions.

## UNIT-V

**Network Management Security:** Overview of SNMP Architecture-SMMPV11 Communication Facility, SNMPV3.

## UNIT-VI

**System Security:** Intruders, Viruses and Related Threats, Firewall Design Principles.

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

## Reference 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.

# Bachelor of Computer Applications

<b>Course Code</b>	<b>Course Name</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
BCA-S308	Information Systems: Analysis, Design & Implementation	3	1	0	4

## UNIT-I

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

## UNIT-II

**Information Requirement Analysis:** Process modelling with physical logical data flow diagrams, data modelling 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 modelling, process modelling, 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 modelling technique, object modelling, dynamic modelling 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.

### Reference Books:

1. I.T.Haryszkiewicz, Introduction of System Analysis and Design, Pearson Education, (PHI) 1998.
2. V.Rajaraman, Analysis and Design of Information System, Pearson Education, 1991.
3. J.A.Senn, "Analysis and Design of Information Systems"
1. J.K.Whiten., L.D.Bentley, V.M.Beslow, "System Analysis and Design Methods", (Galgotia Publications Pvt.Ltd.) 1994

# Bachelor of Computer Applications

<b>Course Code</b>	<b>Course Name</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>BCA-S309</b>	<b>E-Commerce</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>4</b>

## 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, Integration 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.

### Reference Books:

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

# Bachelor of Computer Applications

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

## UNIT-I

**Business Intelligence and Business Decisions:** Modelling 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.

### Reference Books:

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

## **Bachelor of Computer Applications**

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

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

## **Bachelor of Computer Applications**

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

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