

**Student Handbook**

**KANTIPUR CITY COLLEGE**

**PURBANCHAL UNIVERSITY**



**BACHELOR OF COMPUTER APPLICATION  
BCA [I - VI SEM.]**

**“COURSE OF STUDY”**

**2063 [2007]**

**BCA - First Semester**

**Computer System Concepts**  
**BCA 101 CS**

**Year I**

**Semester I**

Teaching Schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal Assessment		Final		Total
3	1	-	Theor y	Practical*	Theory **	Practical	100
			20	20	60	-	

**\*Continuous**

**\*\* Duration: 3 hours**

**Objective:** To provide a foundation in computer systems and its applications in various fields.

1. **Introduction to computer:** Overview of Generation of computer, Types of computer. **4hrs**
2. **Digital computers and its peripherals:** Block diagram, Input/output, CPU, Power supply, Factors affecting processing speed. I/O Devices, the keyboard, the mouse, other input devices, the Monitor, Printers, Sound systems. **6 hrs**
3. **Storage devices:** Types of Storage devices, Magnetic storage devices, Optical storage devices. **5hrs**
4. **Networks:** The uses of a network, categories of networks, network topologies for LANs, Network media and Hardware, Network Software, Data Communication over telephone lines, Modems. **6hrs**
5. **The Internet:** Introduction to Internet, Features of Internet, Introduction to Intranet and Extranet, Internet protocol (FTP, WWW etc). **5hrs**
6. **Introduction to Operating system:** Introduction to OS, Types of OS, Function of OS. **4hrs.**
7. **Types of Database:** Introduction to Data and information, Introduction to DBMS, Types of Database. **3hrs.**
8. **The Multimedia:** Introduction, Components of Multimedia, and Application of Multimedia. **2 hrs**
9. **Computer in Business:** Introduction of computers in modern business, Business Information System, Introduction to E-commerce, computer crime, Information privacy and security. **5hrs.**
10. **Introduction to Programming Languages:** Evolution of Programming Languages, Types of Programming, the Process of Program Development (Flow Chart, Algorithm).

**References**

Peter Norton, Peter Norton's Introduction to Computers, Tata McGraw-Hill Publishing Company Limited.

**Digital Logic  
BCA 102 CE**

**Year: I**

**Semester: I**

Teaching Schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal Assessment		Final		Total
3	1	-	Theory	Practical*	Theory **	Practical	100
			20	-	80	-	

**\*Continuous**

**\*\* Duration: 3 hrs**

**Objective:** To provide a foundation in digital electronics applicable to computer science students.

**Contents:**

**1. Number system and their arithmetic:**

Decimal, Binary, Octal, Hexadecimal, Inter-conversion among different number systems, BCD, Gray code, ASCII code, Binary addition, Subtraction using 1's and 2's complement, Multiplication, Division. **5hrs**

**2. Logic functions and gates:**

AND, OR, NOT, NOR, NAND, XOR, XNOR, Gates symbols and truth table, Tri-state logic. **3 hrs**

**3. Boolean algebra:**

Boolean constant, variables, expressions, function, laws, sum of products and product of sums, equations, simplification using Boolean algebra and Karnaugh-maps, don't care condition. **8 hrs**

**4. Combinational logic Circuits:**

Half and full adder, Sub tractors, Combinational design example, Mux, Demux, Encoder, Decoder, Seven segment decoder. **10 hrs**

**5. Flip-flops:**

RS flip-flop D flip-flop, JK flip-flop, Edge triggered flip-flop, Master-Slave flip-flop. **6 hrs**

**6. Sequential Circuits: State Diagram, Simple Sequential Circuits. **3 hrs****

**7. Registers and Counters:**

Register, left and right shift register, Ripple up and down counter, Decade counter, Mode counter, Synchronous counter, Ring counter, Application of the counter, Serial in serial out, Serial in parallel out, Parallel in serial out, Parallel in parallel out. **8 hrs**

**8. Memories:**

ROM, PROM, EPROM, static RAM, dynamic RAM. **2hrs**

**References:**

- Digital principles and applications Albert Paul Malvino & Donald P. Leach, Tata McGraw Hill-Fourth Edition
- Digital logic and computer design: M.Morris Mano, Phi, 12<sup>th</sup> Edition
- Digital system: Ronald J.Tocci- PHI

**Modern Business Practices**  
**BCA 103 MS**

**Year: I**

**Semester I**

Teaching Schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal Assessment		Final		Total
3	1	-	Theory	Practical *	Theory **	Practical	100
			20	-	80	-	

**\* Continuous**

**\*\* Duration: 3 hrs**

**Course Objective:** The basic objective of this course is to impart basic knowledge of business organization and management.

**Course Content:**

**A. Business Organization**

**5hrs**

1. Nature of Business (Concept & feature)
2. Forms of Business organization
  - a. Sole Proprietorship (Definition, features, merit & demerit)
  - b. Partnership (Definition, features, merit & demerit)
  - c. Joint Stock Company (Definition, features, merit & demerit)

**B. Management**

**5 hrs**

1. Concept and definition of Management
2. Functions of management (Overview):
  - (a) Planning, (b) Organizing (c) Directing and (d) Controlling.

**A. Planning**

**5 hrs**

- (a) Concept of organizing (b) Types of plan (c) Steps in planning
- (d) Implementation of Plans (Major factors effecting implementation of plan).

**B. Organizing**

**5 hrs**

- (b) Concept of organizing
- (c) Structural concept of organizing
- (d) Process concept of organizing
- (e) Organization structure (Bureaucratic structures, matrix structure and virtual organization structure)

**C. Directing**

**2 hrs**

- (a) Concept and nature of directing
- (b) Principle of directing
- (c) Human relations problems in directing

**D. Controlling**

**2 hrs**

- (a) Concept and importance of controlling
- (b) Process of controlling

**C. Human Resource Management**

**1 hrs**

1. Important and significance of HRM

**A. Procurement function**

**5 hrs**

- (a) Human resource planning (b) Job analysis (c) Recruitment
- (d) Selection (e) Socialization

**B. Maintenance Function**

**3 hrs**

- (a) Compensation & incentive handling (b) Discipline (c) Grievance handling

**C. Development Function**

**5 hrs**

- (a) Need assessment
- (b) Training methods (on & off the job)
- (c) Training evaluation
- (d) Management development concept

**D. Motivation Function**

- (a) Concept Motivation
- (b) Theories of Motivation (hierarchy of needs, motivation-hygienic theory, theory x & theory y)

**D. Marketing**

**5**

**hrs**

**1. Meaning of marketing**

- (a) Core concept of marketing behavior
- (b) Marketing Mix
- (c) Concept of buyer behavior
- (d) Need for understanding buying behavior
- (f) Customer value & satisfaction

**2. Implementation of Marketing Program**

**2 hrs**

- (a) Product concept and types of product

**3. Distribution**

**2 hrs**

- (a) Meaning of distribution
- (b) Importance of distribution

**4. Promotion**

**3 hrs**

- (a) Concept of Promotion
- (b) Promotion mix- (I) Advertising (ii) Publicity (iii) Sales Promotion
- (c) Personal Selling

**References:**

1. Rocky W. Griffin: Management, AITBS, Publisher & Distributors, Delhi.
2. Stephen P. Robbins & Mary Coulter: Management, Prentice Hall of India Ltd., India.
3. Dr. G.R.Agrawal: Organization and Management, M.K. Publisher
4. David A. Decanzo A. & Stephen P. Robbins: Personal/Human Resources Management, Prentice Hall of India Ltd. India
5. Dr. G.R. Agrawal: Marketing Management in Nepal, M.K. Publisher
6. Dr. G.R. Agrawal: Human Resource Management in Nepal, M.K.Publisher.
7. Philip Kotler: Principle of Marketing, Prentice Hall of India Ltd., India.

**Mathematics –I**  
**BCA 104**

**Year: I**

**Semester: I**

Teaching Schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal Assessment		Final		Total
4	1	-	Theory	Practical*	Theory **	Practical	100
			20	-	80	-	

**\*Continuous**

**\*\* Duration: 3 hrs**

**Objective:**

Objective of this course is to provide a sound knowledge of calculus and other related topics.

**Unit-1: Sets and Functions:** Sets and Algebra of sets, Union, Intersection, Difference, Complement, Properties and Exercises, Venn Diagram, Real Number System, Intervals, Absolute Value of Real Number line Relations and functions Graphs of simple algebraic function. **8 hrs.**

**Unit-2: Limit And Continuity:** Concept of Limit, Left and right hand limit. Existence of limits, Indeterminate forms, Infinity as Limit, Idea of  $x \rightarrow \infty$ . Continuity, definitions, properties. Exercises on evaluation of limits and test of continuity. **3 hrs.**

**Unit-3: Derivatives:**

**7hrs**

1. Definitions Derivatives
  - (a) Mathematical, (b) slope of a curve, (c) rate of change (relative)
2. Derivative Rules Power, Sum, product, Quotient, Implicit, Chain, Parametric (Mainly algebraic)
3. Trigonometric, Exponential, Logarithmic, Inverse trigonometric.

**Unit-4: Applications of Derivatives:**

**7 hrs.**

1. Sign of  $f'(x)$ - Increasing, Decreasing Functions
2. The sign of  $f'(x)$ , Concavity, Points of Inflexion.
3. More about Graphs, Simple curve tracing
4. Local & Absolute extrema.
5. Indeterminate, Forms, Exercises, Use of L Hospital's Rule, Taylor's and Maclaurins Series (Without Proof).
6. Expansions using the above.

**Unit-5: Integral Calculus:**

**8 hrs**

1. Indefinite integrals as reverse of differentiation.
2. Integration rules – Integration Formulas, Substitutions, Trigonometric Substitutions, and Integration by parts.
3. Standard

Integrals

$$\frac{1}{\sqrt{a^2 - x^2}}, \frac{1}{\sqrt{x^2 + a^2}}, \frac{1}{\sqrt{x^2 + a^2}}, \frac{1}{\sqrt{x^2 - a^2}}, \frac{1}{\sqrt{x^2 - a^2}}, \frac{1}{\sqrt{a^2 - x^2}},$$

$$\sqrt{x^2 + a^2}, \sqrt{a^2 - x^2}, e^{ax} \cos bx, e^{ax} \sin bx, \text{ etc. Use of Partial Fractions.}$$

**Unit-6: Definite Integrals**

**11 hrs.**

1. Limit of a Sum, With exercises
2. Fundamental theorem of Integral Calculus.
3. Evaluation of Integrals using and Standard Integrals.

4. Applications in Calculating Area, Length, Volume and Average Value (Common Curves Only)

**Unit-7: Series**

**11 hrs**

1. Sequence and series, Notations, General terms
2. Limit of Sequence, Partial sum of series, Convergent Sequences, Convergence of Series, Important Series, Financial Series including their Validities, Tests of Convergences applications only Comparison, Ratio, Logarithmic, etc including Integral test.
3. Series with non-negative terms, Alternating Series, Absolute Convergence Conditional Convergence.

**Unit-8:** Function of two and three variables, Extension of ideas of limits and continuing Partial derivatives, theorem Exercises. Higher order derivations Leibnitz theorem. **8 hrs**

**Unit1.** Basic Mathematics Vol. I.

**Unit2.** Basic Mathematics & Calculus with analytic geometry.

**Unit3.** Basic Mathematics & Calculus with analytic geometry.

**Unit4.** Basic Mathematics & Calculus with analytic geometry

**Unit5.** Basic Mathematics, Calculus with analytic geometry & Integral Calculus

**Unit6.** Basic Mathematics, Calculus with analytic geometry & Integral Calculus.

**Unit7.** Algebra, Calculus with analytic geometry & Integral Calculus.

**Unit8.** Differentials Calculus & Calculus with analytic geometry.

**Recommended Text-Book:**

1. Calculus and Analytic Geometry- Thomas and Finney, Narosa Publishing House (India).

**References:**

1. Basic Mathematics (Vol. I&II)- DR. Bajracharya etal
2. Calculus: Different & Integral – R.K. Patnaik.
3. Calculus with Analytic Geometry – Leigthold, Harper & Raw
4. Calculus- Larson Hostetler, Health.
5. Integral Calculus- G.D. pant and G.S. Shrestha
6. Algebra – G.D. Pant
7. Differentials Calculus – M.B. Singh and B.C.B



**Sociology and Professional Ethics**  
**BCA 105 HS**

**Year I**

**Semester: I**

Teaching Schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal Assessment		Final		Total
3	-	-	Theory	Practical*	Theory **	Practical	100
			20	-	80	-	

**\*Continuous**

**\*\* Duration: 3 hrs**

**Objective:**

The basic objective of this course is to impart knowledge to the student on basic concept of sociology. The purpose is to enable them to apply those basic concept in addressing the significant issues inherent in Nepalese society and culture. The ultimate goal is enable the student to understanding the relationship between individual, Society and culture.

**Contents:**

**Unit1** Evolution of Sociology as Scientific Discipline, Relationship of sociology with other social sciences, Application of sociology in addressing contemporary issues.

**Unit 2** Language sociology  
Society, Culture community, Norms and Values, Status and role, social institutions, Association and groups, Social Stratification.

**Unit 3** Fundamental concepts in Sociology  
Social system, social structure, social processes, Socialization. Social change and Ethnocentrism.

**Unit 4** Studying Nepalese Societies.  
Social Stratification in Nepalese Societies on the bases of caste, class, gender, Ethnicity and age, Unity in Diversity, Plurality and the issue of national integration.

**Unit 5** Relationship between Society and technology.  
The Technological society, Third world societies and technological change, the social and cultural bases of technological change, innovation, process and patterns of diffusion of innovation, consequences of technological development on Nepalese society.

**Unit 6** Doing Social Research, Meaning and nature of social research, Steps of Social Research, Society as a Research of data, Data collection Techniques, Survey, Interview Questionnaire, Case study and participant Observation. Data classification, Analysis and presentation of data. Application of Computers in Social Science Research.

**Unit 7** Social Responsibilities of computer professionals.

**Basic Books**

1. Inkles, Alex. 1964, What is Sociology. Delhi: Prentice-Hall of India Private Limited.
2. Giddens, A. and Mitchell, D. 2000. Introduction to Sociology (3<sup>rd</sup> Ed.) London: W.W. Norton & Company

**References:**

1. Banker, T.L. 1998. Doing Social Research. (3<sup>rd</sup> Ed.) New York: McGraw-Hill.
2. Bista, D.B.1996. People of Nepal, Kathmandu: Ratna Prakashan.
3. Bottomore, T.B. 1962. Sociology: A Guide to Problems and Literature. India: Blackie & Son (India) ltd.
4. Ember, C.R. & Ember, M. Anthropology. Anthropology. 1993, Delhi: Prentice Hall Inc.
5. Goode, W.J. 1982. The Family. Delhi: Prentice-Hall Inc.
6. Maclver R.M. & Page, C.H. 1974, Society: An Introductory Analysis, Delhi: Macmillan India Limited.
7. Moore, W.E. 1994. Social Change. Delhi: Prentice-Hall Inc.
8. Schumacher, E.F. 1974, Small is Beautiful: A study of Economics as if People Mattered. London: Abacus.
9. Tumin, Melvin, 1985. Social Stratification, Delhi: Prentice-Hall Inc.

**Digital Lab  
BCA 106 CE**

**Year: I**

**Semester: I**

Teaching Schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal Assessment		Final		Total
-	-	-	Theory	Practical*	Theory **	Practical	100
			-	40	-	60	

\*Continuous

\*\* Duration: 3 hrs

**Objective:** To reinforce the concepts of Digital Logic in the lab Classes.

**Contents:**

- Experiment 1 Introduction of laboratory safety techniques.
- Experiment 2 To Determine the truth table of a Two-Input OR Gate.
- Experiment 3 To Determine the truth table of a Two-Input NOT Gate.
- Experiment 4 To Determine the truth table of a Two-Input NAND Gate.
- Experiment 5 To Determine the truth table of a Two-Input NOR Gate.
- Experiment 6 To Determine the truth table of a Two-Input EX-OR Gate.
- Experiment 7 Verification of Deorgan's theorem experimentally AND using NAND.
- Experiment 8 Verification of Demorgan's theorem experimentally OR using NAND.
- Experiment 9 Verification of Demorgan's theorem experimentally AND using NOR.
- Experiment 10 Verification of Demorgan's theorem experimentally Multiple input gates.
- Experiment 11 Sum of product, product of sum.
- Experiment 12 Incoeder/Decoder.
- Experiment 13 Multiplexer/Demultipiexer
- Experiment 14 7 - segment decoder (Design exercise not implementation with logic gates)Exercise using BCD to 7-Segment IC(7447)
- Experiment 15 Half- Adder/Full-Adder
- Experiment 16 Half-Subtractor/full-subtractor
- Experiment 17 RS-Flip Flop
- Experiment 18 JK-Flip Flop
- Experiment 19 D.T Flip Flop
- Experiment 20 Shift Right/Shift Left Resister
- Experiment 21 Ripple Counter
- Experiment 22 Serial in Serial out
- Experiment 23 Parallel in serial out
- Experiment 24 Parallel in parallel out
- Experiment 25 Serial in Parallel out
- Experiment 26 UP/down counter
- Experiment 27 Mode 10 counter
- Experiment 28 Synchronous ring counter

**References:**

1. Paul B Zbra, Albert P Malvino, Michael A Miller: Basic Electronics – A Text Lab Manual, Tata Megraw –Hill Publishing Company Ltd., New Delhi.

**COMPUTER PROJECT**  
**BCA 107 CS**

**Year: I**

**Semester: I**

Teaching Schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal Assessment		Final		Total
-	-	6	Theory	Practical *	Theory **	Practical	100
			-	40	-	60	

\* **Continuous**

\*\* **Duration: 3 hrs**

**Objectives:**

To familiarize students with operating systems and desktop applications using current versions of Windows.

**Contents:**

**A. Microsoft Windows**

**Part I Introductory**

- Chapter 1 Introduction to OS, Interface, GUI Vs CUI
- Chapter 2 Introductions to Windows, Elements of Windows

**Part II Using Windows**

- Chapter 3 Task bar, Using menus and submenus to search items, opening a program, opening multiple
- Chapter 4 Short cuts and using short cuts Using my computer, Switching off the system

**Part III Customizing windows**

- Chapter 5 Desktop and Custom Wall Papers, Screen Saver,
- Chapter 6 Using Help for interactive learning

**Part IV Using Application**

- Chapter 7 Using general accessories-Notepad, Paint tool, Clipboard, Character map, Calculator etc.
- Chapter 8 Using Multimedia –Using Compact Disk, Using Audio/Video

**Part V Managing Information**

- Chapter 6 Using Explorer to manage files and folders-Copy/Delete/Rename/Short cuts, Sharing information with other storage media.
- Chapter 7 Recycle Bin and it uses.

**Part VI Disk Manager**

- Chapter 8 Using Format, Scandisk and Disk Defragmenter

**B. Microsoft Word**

**Part I Introductory**

- Chapter 1 Introduction to Word, Elements of Word Window, Creating and Saving Document
- Chapter 2 Viewing and Navigating

**Part II            Formatting Fundamentals**

- Chapter 3    Margins and Page Breaks
- Chapter 4    Characters, Fonts and Symbols
- Chapter 5    Formatting Paragraphs
- Chapter 6    Tabs, Tables, Math and Sorting
- Chapter 7    Headers, Footers, Page Numbers and Footnotes
- Chapter 8    Formatting Document with Section Breaks
- Chapter 9    Using Paragraph Styles and Auto format

**Part III           Desktop Publishing**

- Chapter 10   Multiple Columns
- Chapter 11   Bookmarks, Captions and cross-referencing
- Chapter 12   Creating Tables of Contents and Indexes

**Part IV           Graphics in Word**

- Chapter 13   Introduction to Graphic in Word
- Chapter 14   Using the Text Boxes to Frame, Position and Anchor Text
- Chapter 15   Inserting Word Art, Clip Art and Charts

**Part V Productivity Tools**

- Chapter 16   Templates, Wizards and Sample Documents
- Chapter 17   Auto Text, Auto Correct and Insert
- Chapter 18   Author's Tools-Setting Language, Spell Checker, Thesaurus, Word Counts
- Chapter 19   Finding and Replacing
- Chapter 20   Viewing Document – Organizing with Normal, Page Layout and Outline View

**Part VI           Large Documents and Team Projects**

- Chapter 21   Working with Master Documents

**Part VII          Power Tools**

- Chapter 22   Mail Merge – Creating Custom
- Chapter 23   Using Charts and Graphs
- Chapter 24   Concept of OLE: Linking and Embedding
- Chapter 25   Creating and Using Macros
- Chapter 26   Personalizing Word

**Part VIII        Printing Document**

- Chapter 27   Setting up Document for Printing-Page Setup
- Chapter 28   Previewing and Printing

**C. DOS**

- Introduction to Computers
- Introduction to DOS
- Basic DOS Commands
- Managing your Hard disk
- Advanced DOS Commands
- DOS 6 and 6.2 Commands
- Troubleshooting DOS Errors

**D.    Microsoft Excel**

**Part I Introductory**

- Chapter 1    Introduction to Excel: Excel environment, elements of Excel Window
- Chapter 2    Managing Workbooks, Worksheets and Windows
- Chapter 3    Working inside worksheet

**Part II           Basic Skills**

- Chapter 4    Using formulas and functions
- Chapter 5    Formatting/Conditional formatting data and worksheet

Chapter 6 Using paste special

**Part III Tapping Excel's Power**

Chapter 7 The power of range names

Chapter 8 Essentials Worksheet functions

Chapter 9 Using Templates

Chapter 10 Protecting the file and worksheet with passwords

**Part IV Graphics and Chart**

Chapter 11 Working with graphic objects- Clip art, Word art, Map

Chapter 12 Creating basics

Chapter 13 Creating custom charts

Chapter 14 Constructing complex chart using advanced techniques

**Part V Working with Databases**

Chapter 15 Working with internal Database

Chapter 16 Getting more power from worksheet databases

Chapter 17 Accessing external databases

**Part VI Cell Referencing**

Chapter 18 Cell Referencing in Excel: Relative, Absolute and Mixed

Chapter 19 Loan amortization scheduling and calculation

**Part VII Exercising what-if analysis**

Chapter 20 Consolidating and outlining

Chapter 21 Using what-if analysis: Data Table, Goal Seek, Scenario Manager

**Part VIII Pivot Tables**

Chapter 22 Understanding Pivot Tables

Chapter 23 Constructing and analyzing pivot tables

**Part IX Customizing Excel**

Chapter 24 Using custom controls on worksheets

Chapter 25 Effectively using the macro recorder

**Part X Printing worksheet**

Chapter 26 Setting up the worksheet

Chapter 27 Printing worksheets

**E: Microsoft PowerPoint**

**Part I Introductory**

Chapter 1 Introduction to Power point: Creating and Saving Presentation.

Chapter 2 Entering, Editing, and Enhancing Text

Chapter 3 Editing in different views- Outline View, Slide Sorter View

**Part II Graphics in Presentations**

Chapter 3 Creating Graphs

Chapter 4 Editing and Enhancing Graphs

Chapter 5 Adding Clip Arts on Slide

Chapter 6 Editing Arts

Chapter 5 Animating Charts and Art Objects

**Part III Adding Sound**

Chapter 7 Adding Sound – WAV and MID file

Chapter 8 Choosing Sound Effects-Transitional, From Other Sources

Chapter 9 Adding Sounds to Animation and Sound Objects

Chapter 10 Recording Sound and Narration

**Part IV Using Video Clips**

Chapter 11 Adding Movie in Slides

- Chapter 12    Playing and Editing Movie
- Chapter 13    Making Movie Poster and Icon

**Part V Finishing Slides**

- Chapter 14    Slide Show
- Chapter 15    Setting Slide Transition, Speed and Slide Advancement
- Chapter 17    Slide Notes and Comments

**Part VI        Furnishing Presentation**

- Chapter 18    Editing Text Color, Creating Custom Color
- Chapter 19    Background and Schemes

*Part VII        Working with Multimedia Files*

- Chapter 20    Linking and Embedding Objects
- Chapter 21    Importing and Exporting Presentation

**Part VIII Printing Slides and Handouts**

- Chapter 22    Choosing Page Setup for Presentation
- Chapter 23    Adding Header and Footers and Numbering Slides
- Chapter 24    Printing the presentation

**Introduction to Project.**

**References:**

1. Robert Cowart, Mastering Windows- Premium Edition, BPB Publication
2. Ron Mansfield, Mastering Word, BPB Publication
3. Thomas Chester, Richard A Alden, Mastering Excel, BPB Publication
4. Katherine Murray, Mastering PowerPoint, BPB Publication

**BCA - Second Semester**



**Microprocessors and Assembly Language**  
**BCA 151 CS**

**Year: I**

**Semester: II**

Teaching schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal Assessment		Final		Total
3	1	2	Theory	Practical*	Theory**	Practical	100
			<b>20</b>	<b>20</b>	<b>60</b>	<b>-</b>	

\* **Continuous**

\*\* **Duration: 3 Hrs**

**Objectives:**

To become familiar with the operation, programming and application of microprocessors.

- 1. Introduction (3 hrs)**  
Microcomputer, Block diagram of Microcomputer, Microprocessor, Overview of 8086, Microprocessor family, Internal Architecture of 8086, Application of Microprocessors.
- 2. 8085 Instruction Description: (14 Hrs)**  
Categories of Instructions (Transfer, Arithmetic, Logical Control), Instruction format, Internal Architecture of 8085, Addressing mode of 8085, Application of Microprocessors, Program Structure in 8085, Simple Sequence Program, Unconditional and Conditional Jumps, Loop.
- 3. I/O Interface (6 Hrs)**  
Introduction, I/O port Addressing Decoding, Serial and Parallel communication, Parallel communication, 8255 Programmable Peripheral Interface (Mode Only), The 8279 (Block Definition), The 8254 timer (Block of Mode), 8251A Programmable Communication Interface.
- 4. Interrupts (3 Hrs)**  
Introduction, Basic Interrupt Processing, Hardware Interrupt, 8259A Interrupt Controller (Block and Mode Definition).
- 5. Memory Interface (4 Hrs)**  
Introduction, Memory Devices, Address Decoding, 8088 Memory Interface, 8086, 80286 and 80386 SX  
Memory Interface, 80386DX and 80486 Memory Interface, Dynamic RAM.
- 6. DMA (3 Hrs)**  
Introduction, Basic DMA Operation, the 8237 DMA Controller.
- 7. 8086 Instruction Description and Assemble Directives: (12 Hrs)**  
Program Structure in 8086, Block Diagram of 86, Internal Architecture, Addressing Mode, Simple Sequence Program, Flag, Jumps and Conditional Jumps, Loop, Memory Interface with 8086, 8088 Memory Interface (Dot Module)

**8. Introduction to Intel 80186, 80286, 80386, 80486 and Pentium.  
(3 Hrs)**

**References:**

1. Barry B. Brey, the INTEL Microprocessors 8086/8088, 80186, 80286, 80386 and 80486 (architecture, programming and interfacing) PHI
2. Yu Chung Liu and G.A. Gibson Microcomputer systems: The 8086/ 8088 family architecture, programming and design EE edition.
3. Adam Osborne and J. Kane an introduction to Microcomputer Vol. II-some real microprocessors  
Galgotia book source, New Delhi.
4. Douglas V. Hall, microprocessor and interfacing programming and hardware,  
Tata Mc Graw Hill.

**Micro Processor and Assembly Language  
Laboratory Experiments  
(BCA 151 CS)**

**All Laboratory work will be based on assembler (8086)**

**Laboratory 1.**

To enter and to trace a simple assembly language program using DOS DEBUG routine.

**Laboratory 2.**

To write a simple assembly language program that will make logical decisions based on program data, DOS DEBUG routine.

**Laboratory 3.**

To enter and trace a program that contains a loop e.g. the loop instruction to use CX register as a default index counter and decrement CX at the end of each pass, compare CX to zero and if it is greater than zero, jump to the beginning of the loop.

**Laboratory 4.**

To modify the program from laboratory 3, so that the looping is accomplished in a different way. Modify the program so that it does not rely on the 'loop' instruction, but rather, performs the loop operations separately. The output of laboratory 3 and laboratory 4 should be same.

**Laboratory 5.**

To complete an assembly language program to carry out given logical processes and then assemble, link and run e.g. to complete a given program so that it will read a single character from the keyboard and test the character and based on the range within which it falls, either not print it, or change it to lower case and print it, or print it unmodified.

**Laboratory 6.**

To modify the program of laboratory 5, so that it will read a string of characters and select them by the same as in laboratory 5.

**Before starting above Lab Exercises, students should verify all basic Instructions.**

**Hardware and System Installation**  
**BCA 152 CE**

**Year: I**

**Semester: II**

Teaching schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal Assessment		Final		Total
2	1	3	Theory	Practical*	Theory **	Practical	100
			20	20	60	-	

\* **Continuous**

\*\* **Duration: 3 Hrs**

**Objective:**

This course trains students in the practical estimation, design, installation and management of LANs of PCs. Installation of memory, cards, basic networking, system installation, security issues, and estimation of requirements.

**Content (Theory/Practical)**

**1. Components of computers**

**(19 Hrs)**

Speed, Memory, BIOS, Bus, CMOS setup, Microprocessor, Coprocessor, Power Supply, Drives, Expansion Slots Interfaces. /\* Introduction \*/

**2. Assembling and Disassembling a computer**

**(4 Hrs)**

Cable connection, Identifications, Power requirements, Careful handling hints and practice.

**3. Maintenance**

**(2 Hrs)**

Environmental safety, Routine checks and troubleshooting, Power backups, Data Protection, Virus protections. Using various other Utilities, Hard Disk preventive maintenance.

**4. Installation of Hardware Components**

**(2 Hrs)**

Printers, Drives, Expansion cards, Memory modules, Modems, Multimedia system, network components, NIC cable.

**5. Software Installation**

**(2 Hrs)**

Installing operating systems DOS and Windows 98/2000, Driver softwares. Customizing, Memory management.

**6. Specification:**

Important of Specification, Estimation and Planning, Case study on office automation.

**References:**

1. Winn L. Rosch, The Hardware Bible 3<sup>rd</sup> Edition, PHI.
2. Mark Minasi, The Complete PC upgrade and Maintenance Guide.
3. Scott Mueller, Upgrading and Repairing PCs

## **Syllabus for BCA – Purbanchal University**

---

Detailing of the Components of a Computer

1. Types of PC (PC AT to Pentium 4) w.r.t. speed, Processor, buses, wordsize  
(6 Hrs)
2. Motherboard: slots, daughter board, expansion bus  
Hrs) (5
3. BIOS (1 Hr)
4. Power Supply (SMPS) (1 Hr)
5. Drives: Hard Disk, CD Rom, Floppy (Geometry & working of all) Introduction  
to other drives: (4 Hrs)
6. Printer: Introduction to Dot Matrix Inkjet, Laser Printers (1 Hr)
7. Computer Virus (1 Hr)

**Mathematics-II**  
**BCA 153 CS**

**Year: I**

**Semester: II**

Teaching schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal Assessment		Final		Total
3	1	-	Theory	Practical*	Theory**	Practical	100
			40	-	60	-	

\* **Continuous**

\*\* **Duration: 3 Hrs**

**Objective:**

Understanding of Vectors in spaces and their application along with matrix algebra, and its uses in the solution of equations.

**Unit-1: Fundamentals of Vectors:**

**(9 Hrs)**

Vector components sum and difference of Vectors, equal vectors, unit vectors, Zero vector, vectors in plane, vectors in space, use of **i, j, k**. Direction cosines, Direction ratios, relations among the direction cosines, modulus of vectors, distance between two points, the scalar product and vector product of two vectors and their properties.  **$\mathbf{a} \cdot \mathbf{b} = 0 \Rightarrow \mathbf{a} \perp \mathbf{b}$ ,  $\mathbf{a} \times \mathbf{b} = 0 \Rightarrow \mathbf{a} \parallel \mathbf{b}$** , and other relations, including physical applications, Product of three and more vectors (definitions and simple examples only), Coordinates in space: (i) Cartesian, (ii) Cylindrical, (iii) Spherical and Transformations from one system to another, with simple applications.

**Unit-2: Differentiation of Vector Functions:**

**(4 Hrs)**

Definition of derivatives of vectors functions, Exercises involving derivatives of vector functions,  $d/dt (\mathbf{r}_1 \times \mathbf{r}_2)$ , etc. Differentiation of  $\nabla \phi$ ,  $\nabla \cdot \mathbf{F}$ ,  $\nabla \times \mathbf{F}$  and simple relations involving grad, div and curl, Definition of directional derivatives and their evaluation.

**Unit-3: Plane Analytic Geometry:**

**(10 Hrs)**

a. Conic section as sections of a cone. Standard equation and general equation of a circle condition for second degree equation to represent a circle, Determination of center and radius of a circle in the form  $x^2 + y^2 + 2gx + 2fy + c = 0$ . **(2 Hrs)**

b. Definition of parabola as the locus of points equidistant from a point and a line. Derivation of equation to a parabola in the form  $y^2 = 4ax$ , Determination of vertex, focus, axis, directrix of a parabola in the general form. Condition for second degree equation to represent a parabola. **(2 Hrs)**

c. Ellipse as the locus of points the sum of whose distances from two points is a constant. Derivation of equation to a parabola in the standard form. Center, foci, vertices, directrices, eccentricity of  $(x - h)^2/a^2 + (y - k)^2/b^2 = 1$  by changing into  $X^2/a^2 + Y^2/b^2 = 1$ , with  $X = x - h$ ,  $Y = y - k$ . Condition for second degree equation to represent an ellipse. **(2 Hrs)**

d. Hyperbola as the locus of points the difference of whose distances from two points is a constant. Equation in the form  $(x - h)^2/a^2 - (y - k)^2/b^2 = 1$ ,  $X^2/a^2 - Y^2/b^2 = 1$ . Center, foci, vertices, directrices and eccentricity determination. Condition for second degree equation to represent a hyperbola. Asymptotes of a hyperbola in the standard form. **(2 Hrs)**

e. Quadratic curves, Conditions for the general equation of second degree to represent a circle, a parabola, an ellipse and a hyperbola, Use of discriminant to

identify the curve, Reduction to the standard form and determination of center, vertex, foci, directrices and axes. **(2 Hrs)**

**Unit-4: Differential Equations: (8 Hrs)**

Definition, order, degree, formation by elimination of constants, Solution of differential equation of 1<sup>st</sup> order- 1<sup>st</sup> degree, Variable separation, homogeneous, exact linear, reduction to Linear equations.

Second order homogeneous equation, Second order linear equations with constant coefficients using (i) Undetermined coefficients, (ii) Variation of parameter and (iii) Inverse operator method.

**Unit-5: Matrix Algebra: (5 Hrs)**

Introduction to Matrices, Sum and differences of Matrices, Scalar multiplication, Multiplication of Matrices, Multiplication using Matrices of third order, Determinants, properties, Evaluation, Transpose, Adjoint and Inverse of Matrices.

**Unit-6: Linear Equations: (5 Hrs)**

Consistent and Inconsistent equations (linear), Dependent and independent system, Solution of systems of 2 or 3 linear equations by (i) Cramer's Rule, (ii) Gaussian Elimination and (iii) Inverse Matrix.

**Recommended Textbooks:**

1. Calculus and Analytic Geometry- Thomas and Finney, Narosa Publishing House (India).
2. Matrices and Linear Algebra- K.C. Prasad, S. Chand & Company(India).

**References:**

1. Calculus with Analytical Geometry- Thomas and Fenney,
2. A text book of vector Calculus – MB Singh and BC Bajracharya,
3. Basic Mathematices Vol. I and II- DR Bajracharya et al.

**Financial & Cost Accounting**

BCA 154 MS

**Year: I**

**Semester: II**

Teaching schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal Assessment		Final		Total
4	1	1	Theory	Practical*	Theory**	Practical	100
			20	20	60	-	

\* Continuous

\*\* Duration: 3 Hrs

**Objective:**

The basic objective of this course is to impart the students with the fundamental knowledge of financial and cost accounting and Double entry accounting.

**1. CONCEPTUAL FRAMEWORK OF ACCOUNTING:**

- Need of accounting information.
- Nature & scope of accounting.
- Classification of accounting.
- Double entry accounting.

**2. ACCOUNTING STANDARD BASE OF ACCOUNTING:**

- Accounting Principles standard & bases.
- Concepts of capital & revenue.

**3. FUNDAMENTALS OF COMPUTERISED ACCOUNTING SYSTEM:**

- Concepts of grouping the accounting heads,
- Schemes of assisting the codes to accounting heads,
- Maintaining the hierarchy of ledger accounts for preparing control accounts.

**4. APPLICATION OF COMPUTERS IN ACCOUNTS:**

- Accounting Procedure used in practice for recording,
- Cash, Bank and Journal transaction using appropriate vouchers.

**5. PREPARATION OF LEDGERS, CASHBOOK AND BANKBOOK**

**6. INTRODUCTION DIFFERENT SHARES CAPITAL.**

**7. PREPARATION OF TRIAL BALANCE, FINAL ACCOUNTS OF SELF PROPRIETORSHIP AND JOINT STOCK COMPANY**

**8. ACCOUNTING FOR PETTY CASH TRANSACTIONS AND PREPARATION OF PETTY CASH REGISTER**

**9. PAYROLL PROCEDURE, ACCOUNTING SYSTEM FOR PREPARING AND MAINTAINING PAYROLL**

**10. INVENTORY ACCOUNTING & CONTROL:**

- JIT inventory system,
- Economic order quantity (EOQ)
- ABC analysis,
- VED analysis,
- Inventory turns over ratio,



- Cost price methods: - LIFO, FIFO, HIFO and NIFO.

**11. ACCOUNTING SYSTEM FOR ORDER BOOKING PROCESSING:**

- Forwarding and acceptance and invoicing for a trading organization)

**12. BUDGET FOR PLANNING:**

- Basic concepts,
- Organization for budgetary control,
- Cash budget.

**13. ACCOUNTING FOR DECISION-MAKING:**

- Marginal costing,
- Meaning of marginal costing,
- Income statement under marginal costing,
- Marginal cost equation.

**14. STANDARD COSTING:**

- Standard cost,
- Standard costing,
- Standard costing & budgetary control,
- Standard cost card,
- Material variance,
- Labor variance,
- Overhead variance.

**15. RATIO ANALYSIS:**

- Classification of ratio,
- Balance sheet ratio,
- Profit and loss accounts ratio,
- Composite or mixed ratio for management,
- Ratio for creditors,
- Ratio for shareholders.

**Note:** Emphasis should be on using computer package (e.g. Tally, Facts, etc).

**Basic Books:**

1. T.S. Grewal, Introduction to Accounting
2. S.P. Jain & K.L. Narang, Cost Accounting Principles & Practice, 15<sup>th</sup> Rev. Ed. 1999
3. K.G Gupta & D.C. Sharma, Management Accounting, SJ Publication

**References:**

1. S.P. Jain & K.L. Narang, Financial Accounting
2. Sukla & Grewal, Advanced Accounts, S. Chand.
3. Jawahar Lal, Cost Accounting, Tata McGrawHill Publishing

**Programming I**  
**BCA 155 CS**

**Year: I**

**Semester: II**

Teaching schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal Assessment		Final		Total
3	-	3	Theory	Practical*	Theory**	Practical	100
			20	20	60	-	

\* Continuous

\*\* Duration: 3 Hrs

**Objective:**

The objective of this course is to give the fundamentals of the programming to the students using "C".

**Contents:**

- 1. Introduction to C (2 Hrs)**  
History, ANSI standard, Importance of C, Basic Structure of C programs, Programming Style, Executing a C Program.
- 2. C fundamentals (2 Hrs)**  
Character Set, C tokens, keywords and identifiers, Constants, Variables, Data types, Escape sequences, Preprocessors directives.
- 3. Operators and expression (5 Hrs)**  
Arithmetic of Operators, Relational operators, Logical operators, Assignment operators, Increment and Decrement Operator, Conditional operators, Bit-wise operators, Arithmetic Expressions. Evaluation of Expressions.
- 4. Data Input and output (2 Hrs)**  
Reading and writing data, Formatted input, Formatted output.
- 5. Decision Making and Branching (4 Hrs)**  
IF Statement, The IF-ELSE Statement, The Switch Statement, The ?: Operators, The GOTO Statement.
- 6. Loops (3 Hrs)**  
The While Statement, The DO Statement, The FOR Statement.
- 7. Arrays (5 Hrs)**  
Introduction, One Dimensional arrays, Two Dimensional arrays, Multi-Dimensional arrays.
- 8. Functions (5 Hrs)**  
Introduction, The form of C Function, Return values and their types, Calling a Function, Categories of Functions, Recursion, Function and Arrays, 'C' built in Function.
- 9. Structures and Unions (4 Hrs)**  
Introduction, Structure definition, Arrays of structures, Array within structure, Nesting and its importance, Union and its importance, Structures and functions.

**10. Pointers**

**(8 Hrs)**

Introduction, Accessing the address of a variable, Declaring and Initializing Pointers. Accessing a variable through its Pointer, Pointer Expressions, Pointers and Arrays. Pointers and Function, Pointers and Structures.

**11. File Management in C**

**(3 Hrs)**

Introduction, Defining and Opening a file, Closing a file, Input/ Output Operations on files.

**12. Introduction to Graphics**

**(2 Hrs)**

Initialization, Graphical mode, Simple Program using built in Graphical Function.

**References:**

1. Schaum's Out line series, theory & problems, programming with C
2. Yashvant Kanetkar, Let us C, BPB Publications.
3. Balguruswamy, Programming in "C", Tata McGraw- Hill Publishing

**COMPUTER PROJECT II**

BCA 156 CS

**Year: I**

**Semester: II**

Teaching schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal Assessment		Final		Total
-	-	4	Theory	Practical*	Theory **	Practical	100
			-	40	-	60	

\* Continuous

\*\* Duration: 3 Hrs

**Objective:**

After finishing this project students will be able to develop application using "C" Programming language.

- Each student will be assigned a project-work related to programming "C".
- Every student should spend Four hours per week in the laboratory to finish up the assigned project-work.

**BCA - Third Semester**

**Data structure & algorithms  
BCA 201 CS**

Year II

Semester I

Teaching Schedule Hours/Week			Examination Scheme				
Theory	Tutorial	<b>Practical</b>	Internal Assessment		Final		Total
3	1	2	Theory	Practical*	<b>Theory **</b>	Practical	100
			20	20	60	-	

\* Continuous

\*\*Duration: 3 hours

**Objective:** To provide fundamental knowledge of data structure, various algorithms used, and their implementations.

Contents:

- 1. Introduction to Data Structure:** Data Types, ADT and importance. **(3 hrs)**
  
- 2. Stack:** Defining stacks, examples, primitive operations with examples representing stack in C, implementing the POP operation, implementing the PUSH operation, infix, postfix and prefix, basic definitions, evaluating a postfix expression, converting an expression from infix to postfix. **(4 hrs)**
  
- 3. Queue:** Defining queue, Queue representation, C implementation of queues insert operation, Priority queue, Circular queue. **(3 hrs)**
  
- 4. Linked-list:** Introduction to list, linked list, inserting and removing nodes from a list, list traversal, linked implementation of stack, linked implementation of queue, doubly linked lists, circular linked list. **(6 hrs)**
  
- 5. Trees:** Basic terminology, Binary trees, operations of binary trees, application of binary trees, traversal of a binary tree, in order traversal, post order traversal, preorder traversal, depth, level, height of a tree, tree balancing algorithm. **(6 hrs)**
  
- 6. Recursion:** Definition and Processes, Factorial, Multiplication of natural numbers, Fibonacci sequences, Binary search, Tower of Hanoi, Translation from prefix to postfix, Efficiency of recursion. **(3 hrs)**
  
- 7. Binary:** Search Tree: Operation on Binary search tree, insertion in binary search tree, deletion in binary search tree, search tree: Operation on Binary search tree. **(4 hrs)**
  
- 8. Graphics:** Defining graphs, basic terminology, Application of graphs, graph traversal, depth first search (DFS), breadth first search, Krushkal algorithm, Greedy algorithm, shortest path method. **(6 hrs)**
  
- 9. Sorting:** Introduction, Sequential sort, Selection sort, quick sort, bubble sort, merge sort, heap sort, radix sort, efficiency consideration, big-o notation. **(7 hrs)**
  
- 10. Searching:** Binary search technique, Tree searching. General searching, Hashing **(3 hrs)**

References:

1. Data Structure using C & C++. Aarton M. Tenenbaum
2. Fundamental of Computer algorithms H. Sahani
3. Data Structure of Program Design: Robert L. Kruse
4. The art of Programming, sorting and searching: Donald E. KNUTI-1

5. Data Structure and Application: Trebly and Sorenson.

**Computer System Architecture  
BCA 202 CS**

**Year II**

**Semester I**

Teaching Schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal Assessment		Final		Total
3	1	-	Theory	Practical*	Theory **	Practical	100
			20	-	80	-	

\* Continuous

\*\*Duration: 3 hours

**Objective:** To provide the concepts of computer architecture as well as computer organization and design.

**Contents:**

- 1. Introduction:** Structure computer organization, languages, Levels, and virtual machines, Contemporary multilevel machines. **(1 hrs)**
- 2. Computer system organization:** CPU organization, instruction execution, RISC Vs CISC, Design principles for modern computers, instruction level parallelism, processor level parallelism. **(3 hrs)**
- 3. Sequential circuits:** State table, State diagram. Design examples, Design procedure. **(2 hrs)**
- 4. Register transfer and micro operations:** Register transfer language, Register transfer, Bus and memory transfers. Arithmetic micro operations. Logic micro operations. Shift micro operations, Arithmetic logic shift unit. **(5 hrs)**
- 5. Basic computer organization and design:** Instructions codes, computer registers, computer instructions, timing and control, instruction cycle, memory reference instructional, input and output interrupt, complete computer description, design of basic computer, design of accumulator logic. **(8 hrs)**
- 6. Micro programmed Control:** Control memory, address sequencing, micro program example, design of control unit. **(7 hrs)**
- 7. Central Processing Unit:** General register organization, stack organization, instruction format, addressing modes, data transfer and manipulation, program control, RISC. **(5 hrs)**
- 8. Computer arithmetic:** Adding and subtraction, multiplication algorithms, division algorithms, floating point arithmetic operations, decimal arithmetic unit, decimal arithmetic operations. **(4 hrs)**
- 9. Input Output organizations:** Peripheral device, input-output interface, asynchronous data transfer, modes of transfer, priority interrupt, DMA, input-output processor, serial communication. **(5 hrs)**
- 10. Memory organization:** Memory hierarchy, Auxiliary memory, associative memory, cache memory, virtual memory, memory management hardware. **(5 hrs)**

**References:**

1. M. Mrris Mano, Computer System Architecture, PHI
2. Andrew S. Tenenbuam, Structured computer Organization, PHI



**Database Systems  
BCA 203 CS**

**Year II**

**Semester I**

Teaching Schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal Assessment		Final		Total
3	1	2	Theory	Practical*	Theory **	Practical	100
			20	20	60	-	

\* Continuous

\*\***Duration: 3 hours**

**Objective:** After finishing this course, students will be able to design, implement and use database systems. Students will also be good at using Structured query language.

**Contents:**

Introduction: Definition of database, Definition of database system, Characteristics of database approach, Definition of DBMS, Advantages and benefits of using a DBMS.

**1. Introduction:** Definition of database, Definition of database system, Characteristics of database approach, definition of DBMS Advantages and benefits of using a DBMS. **(2 hrs)**

**2. Database systems concepts and architecture:** Data models, Schemas and instances, DBMS architecture and data independence, Database language and interfaces, Database system environment, Classification of database management systems, Data dictionary, E-R model, Using high level conceptual data model for database design, Entity types, Entity sets, Attributes, Keys, Relationship types, Roles and structural constraints, real entity types, Refining the E-R design, Naming conventions. **(8 hrs)**

**3. Relational model:** Introduction to relational databases, Relational algebra and calculus, Catalogue, Views, Domains, Kinds of relations, relations and predicates. **(5 hrs)**

**4. Integrity constraints:** Domain constraints, Referential integrity, Assertion, Triggers. **(3 hrs)**

**5. SQL:** Introduction, Set operation, Aggregate function, Null values, Queries, Views, Join relation, DDL, DML. **(8 hrs)**

**6. Normalization:** Pitfalls of relational model, Functional dependencies (1NF, 2NF, 3NF), Boyce/Codd normal form, Multi-valued dependency and 4 NF, Join dependencies and 5 NF. **(12 hrs)**

**7. Database security:** SQL access for database security, Access control: Discretion and mandatory control, Encryption and description: substitution and transposition methods. **(3 hrs)**

**8. Concurrency control:** Transaction, State, Automaticity and durability, Concurrent, Serizability, Protocol, Multiple granularity, Deadlock, Concurrency control, Buffer management. **(4 hrs)**

**Text book**

1. Database system concept, Silberscratz ct.al., McGraw Hill, 3<sup>rd</sup> edition,

**References:**

1. An introduction to database system, C.J. Date, Addison Wesley:
2. Fundamentals of database systems, Ramez Elmasri, Shamkant B. Navathe.

**System Analysis and Design  
BCA 204 CS**

**Year II**

**Semester I**

Teaching Schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal Assessment		Final		Total
3	1	-	Theory	Practical*	Theory **	Practical	100
			20	-	80	-	

\* Continuous

\*\*Duration: 3 hours

**Objective:** After finishing this subject, students will be able to analyze and design a computer Information system.

- 1. System Environment:** Information system, Methods and Tools, System Structure **(4 hrs)**
- 2. System Coordination:** The changing organization, Information exchange, Work. **(3 hrs)**
- 3. Concept Formation:** Problem, Solution, Feasibility **(5 hrs)**
- 4. Requirement Analysis:** Communication, Identifying Requirements, collection **(5 hrs)**
- 5. Analysis Process:** The essential model, Environmental model, Behavioral model, User, Implementation model, Automated tools, Interviewing and data gathering. Cost benefit analysis, Modeling tools: DFD, DD, ER diagram, Balancing models. **(10 hrs)**
- 6. Development Process:** Teams and work. SDLC, waterfall Model, Prototyping, Decision Support System. **(4 hrs)**
- 7. Structured system design:** Structured chart, Module specification methods. **(3 hrs)**
- 8. Object Modeling:** Object Environment, Object Structure, Representation **(4 hrs)**
- 9. Designing New System:** System objective, Logical Model **(3 hrs)**
- 10. Implementation:** Planning, Test preparation, Acceptance test preparation. **(2 hrs)**
- 11. Quality:** Quality assurance, Walkthrough **(2 hrs)**

**Textbook:**

1. Introduction to system analysis & design, Igor Hawrysjkiewicz, PHI, 4<sup>th</sup> edition

**Syllabus for BCA – Purbanchal University**

**Script Programming  
BCA 205 CS**

Year II

Semester I

Teaching Schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal Assessment		Final		Total
2	1	3	Theory	Practical*	Theory **	Practical	100
			20	20	60	-	

\* Continuous

\*\*Duration: 3 hours

**Objective:** After finishing this subject, students will be able to web pages using HTML and JAVA SCRIPT.

1. **HTML:** Introduction to HTML, Lists, Adding Graphics to HTML documents, Tables, Linking documents, Frames. **(8 hrs)**
2. **Scripting:** Introduction to Scripting, Myths, Client side scripting, Script security **(2 hrs)**
3. **Lexical structure:** Case sensitivity, Identifiers, Optional semicolons, Literals, Reserved words. **(2 hrs)**
4. **Data types & values:** Numbers, Strings, Boolean values, Functions, Objects, Arrays, Null, Date objects, regular expression **(2 hrs)**
5. **Variables:** Typing, Declaration, Scope, Garbage collection, Variables as properties. **(2 hrs)**
6. **Expression & operators:** Overview, Arithmetic, Equality, Comparison, String, Logical, Bitwise, and Assignment. **(2 hrs)**
7. **Statements:** Conditional, Control, Import & Export, Empty. **(2 hrs)**
8. **Functions:** Defining & invoking, Function as data, Function scope, Function argument, Function properties & methods. **(4 hrs)**
9. **Objects:** Objects & properties, Constructors, Methods, Prototype & inheritance, Object as associative arrays. **(5 hrs)**
10. **Scripting in web browser:** Web browser environment, Embedding script in HTML, Executing scripts. **(1 hrs)**
11. **Windows & frames** **(2 hrs)**
12. **Document object model** **(4 hrs)**
13. **Events and event handling** **(3 hrs)**
14. **Forms and form elements** **(4 hrs)**
15. **Saving state with cookies** **(2 hrs)**

**Reference:**

1. JavaScript the definitive Guide, David Flangan, O' REILLY, SPD.3<sup>rd</sup> edition
2. Mastering JavaScript & Jscript, James Jaworski, BPB publication.

**Computer Project III**  
**BCA 206 CS**  
**(Based on BCA 203 CS)**

Year II

Semester I

Teaching Schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal Assessment		Final		Total
-	-	4	Theory	Practical*	Theory **	Practical	100
			-	40	-	60	

\* Continuous

\*\***Duration: 3 hours**

**Objective:** After finishing this project, students will be able to develop application Software using RDMS, MS Access.

**Contents:**

**A total of 60 lab hours covering all features of MS Access will be assigned to every student. Every group consisting of these students will be assigned a project work related to developing an application software using MS Access.**

Object Oriented Programming in C++  
**BCA 207CS**

**Year II**

**Semester I**

Teaching Schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal Assessment		Final		Total
3	1	2	Theory	Practical*	Theory **	Practical	100
			20	20	60	-	

\* Continuous

\*\***Duration: 3 hours**

**Objective:**

To provide fundamental knowledge of object oriented programming.

**Contents:**

- 1. Introduction to Object Oriented Language:** Comparing procedural programming and Object oriented programming paradigm, Objects, Classes, Inheritance, Reusability, Creating new data types, polymorphism, Applications and benefits of using OOP.
- 2. C++ Language Basic Syntax :**  
Derived types, Standard conversion and promotions, new and delete operators, constants, Enumeration, comments.
- 3. Function in C++:** Function overloading, default arguments, inline function.
- 4. Object and Classes:**  
Introduction, class specification, data encapsulation, class objects, accessing class members, defining member functions, this pointer, static function, pointers within a class, passing objects as argument, returning objects from functions, friend function and friend classes.
- 5. Constructor and Destructor:**  
**Function of constructor & destructor, syntax of constructor and destructor, types of construction.**
- 6. Operator Overloading:**  
Introduction, operator overloading restrictions, overloading restrictions, overloading unary and Binary operators, Operator overloading using a friend function, Data conversion; conversion between basic types, conversion between objects and basic types, conversion between different classes.
- 7. Inheritance:**  
Introduction, Types of Inheritance, Inheritance; Basic class pointers to Derived-class pointers, using constructors and Destructors in Derived classes, Benefits and cost of Inheritance.
- 8. Virtual functions and Polymorphism :**  
Introduction, Virtual function, Pure Virtual function and Abstract Classes, Using virtual function, Early versus late Binding.

**9. Input/Output:**

Stream based input/output, input/output class hierarchy, and File input/output.

**10. Advanced C++ topics:**

Templates, Introduction to Templates, Function Templates, class Templates.

**11. Exceptions:**

Introduction to Exceptions, Exception Handling Model, Exception Handling Construct; try, throw, catch.

**References:**

1. Robert Lafore, Object-Oriented programming in C++, Galgottia Publication, India.
2. Deitel & Deitel, C++, How to Programme, 3<sup>rd</sup> Edition, Prentice Hall.
3. NavaJyoti Barkakati, Object-Oriented Programming in C++, Prentice Hall of India.
4. Venugopal, Rajkumar & Ravishankar, Mastering C++ , Tata McGraw Hill Publication, India.

**BCA - Fourth Semester**



**COMPUTER NETWORKING**

BCA 251 CS

**Year: II**

**Semester: II**

Teaching schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal Assessment		Final		Total
3	1	2	Theory	Practical*	Theory**	Practical	100
			20	20	60	-	

\* Continuous

\*\* Duration: 3 Hrs

**Objective:**

The course aims at providing a sound conceptual foundation in the area of Computer Networks with emphasis on the design aspects. The course attempts to provide a balanced treatment of the state-of-the-art in the area and thus prepares the students for taking more rigorous and specialized courses in this and related fields.

**Contents:**

**1. Data communication: (8 Hrs)**

Concepts of data, signal, channel, bandwidth, bit rate and baud rate. Fourier analysis, Maximum data-rate channel. Analog and digital communications, Asynchronous and synchronous transmission Data encoding techniques, Multiplexing. T1/ E1 carrier systems, Transmission medium, Transmission errors, error-detection and correction codes.

**2. Network classification and data communication services: (8 Hrs)**

Local area networks, Metropolitan Area Network, Wide Area Networks, Wireless Network, Inter-network, Switched multi-megabit data service. X. 25, Frame relay, Narrowband and broad band ISDN, Asynchronous transfer modes.

**3. Network reference models: (5 Hrs)**

Layered architecture, Protocol hierarchies. Interface and services, ISO- OSI reference model, TCP/ IP reference model, Novel Networks, Internet protocol stacks.

**4. Data Link layer functions and protocols: (6 Hrs)**

Framing, Error control, Flow control sliding window protocol, HDCL, SLIP and PPP protocol.

**5. TCP/IP: (2 Hrs)**

TCP/IP architecture, IP classification

**6. Routing: (16 Hrs)**

Routing basics, Static routing techniques, Distance vector routine and its problems, Link state routine and its variance. A brief study of other routine scheme. Congestion control/ Avoidance basics, Congestion control scheme/ Mechanisms, Internetworking, The internet protocol version 4 (Ipv 4). IP subncting, Superneting, IP multicasting, CIDR, ICMP, IGMP, IGRP, EGRP basics, ATM Internetworking, AAL-x basics, Mobile computing oriented Routing schemes, Mobile IP versus IP, Issues related to the Design of the transport Layer, Transport Layer Protocol, Basics Transmission Control Protocol (TCP), TCP Crash Recovery, User Datagram. Protocol (UDP), Network Security, Issues Domain Name System basics, Electronic Mail and HTTP protocols.

**Laboratory:** There shall be laboratory classes that include cabling, network operating system server and client installation, configuration and networking system administration

**References:**

1. A. Tancnbaum, Computer Networks. III Ed. Prentice Hall East. Econ. Ed.
2. G. Keiser, Local Area Networks. McGraw – Hill International Ed.
3. F. Derfler, Jr. Guide to Linking LANs.
4. S. Keshav: An Engineering Approach to Computer Networking, Addison-Wesley Longman, 1997
5. William Stallings: Data and Computer Communications. Fifth Edition, Prentice Hall of India, New Delhi, 1997
6. D.E. Corner: Internetworking with TCP/ IP, Volume 1, Third Edition, Prentice Hall of India, 1995
7. Marshall T. Rose: The Open Book: A practical Perspective on OSI, Prentice Hall, 1990

**OPERATING SYSTEMS**

BCA 252 CS

Year: II

Semester: II

Teaching schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal Assessment		Final		Total
3	1	2	Theory	Practical*	Theory**	Practical	100
			20	20	60	-	

\* Continuous

\*\* Duration: 3 Hrs

**Objective:**

To provide the concepts of operating systems and implementation of system utilities for inter process communication in a multiprocessor environment.

**Contents:**

- 1. Introduction (4 Hrs)**  
 Operating system as an extended machine & resource manager.  
 History of operating system.  
 Operating system concepts.  
 Operating system structures.
- 2. Processes (10 Hrs)**  
 Introduction  
 Inter- process communication (Race Condition, Semaphores, Monitors etc)  
 Process scheduling
- 3. Memory management (10 Hrs)**  
 Memory management without swapping  
 Swapping  
 Virtual memory  
 Page replacement algorithm  
 Predicting page faults  
 Segmentation with paging
- 4. File systems (8 Hrs)**  
 Files  
 Directories  
 File system implementation  
 Protection mechanism
- 5. Input/ Output (8 Hrs)**  
 Principles of input output hardware  
 Principles of input output software  
 Disks  
 Clocks  
 Terminals

**6. Deadlocks (5 Hrs)**

Resources  
Condition for deadlocks  
Deadlock modeling  
Ostrich algorithm  
Deadlock detection and recovery  
Deadlock avoidance & prevention

**7. Case study:**

- a. UNIX
- b. MS- DOS
- c. NT

(No classes are allotted to the case study; the students themselves referring various books should study this unit.)

**Textbook:**

- Andrew S. Tanenbaum, Modern operating system, PHI
- Silbersatz and Galvin: "Operating System Concepts, 5<sup>th</sup> edition", Addison Wesley

**STATISTICS AND PROBABILITY THEORY**

BCA 253 HS

Year: II

Semester: II

Teaching schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal Assessment		Final		Total
3	1	-	Theory	Practical*	Theory**	Practical	100
			20	-	80	-	

\* Continuous

\*\* Duration: 3 Hrs

**Objective:**

After the completion of the subject, students are expected to be able to (i) Assemble Data (ii) Analyze Data (iii) Determine Central Tendency, Distribution and make viable conclusions for decision-making.

**Contents:**

1. **Nature And Scope of Statistics:** Definitions of Statistics; Theoretical and Applied Statistics; Descriptive And Inferential Statistics: Functions of Statistics; Scope of Statistics; Limitations and Distrusts of Statistics; Experimental and Statistical Methods
2. **Data And Its Collection:** Primary and Secondary Data; Advantages and Disadvantages of Secondary Data, Collection of Data various Steps Involved.
3. **Classification And Tabulation of Data:** Classification Procedure: Qualitative And Quantitative Classification; Tabulation of Data; Guidelines For Classification of Data.
4. **Diagrammatic And Graphic Representation of Data:** Importance And Limitations; The Rules For Diagrammatic And Graphic Presentation of Data. Types of Diagrammatic Representations, Bar Diagram; Pie Diagram; Pictogram; Types of Graphic Representations; Histogram; Frequency Polygon; Frequency Curve; Cumulative Frequency Curve (Ogive).
5. **Measures of Central Tendency:** Arithmetic Mean: Weighted Arithmetic; The Median; Quartiles; Deciles and Percentiles; The Mode; Relation Between Mean, Median and Mode.
6. **Measures of Dispersion:** Absolute and Relative Measures; The Range; Inter Quartile Range; Quartile Deviation: Mean Deviation; Standard Deviation; Coefficient of Variation, Skewness: Kurtosis: Comparison Between Dispersion, Skewness And Kurtosis.

7. **Probability:** Preliminaries; Trial And Event: Exhaustive Favorable, Equally Likely, Mutually Exclusive And Independent Events; Definitions of Probability, Mathematical Expectation.
  
8. **Theoretical Distributions:** Introduction: Binominal Distribution And Its Chief Features (Without Proofs): A Few Simple Examples of Fitting A Binominal Distribution ( Poisson Distribution And Its Chief Features With Proof); A Few Examples; Normal Distribution And Its Chief Features; Areas Under Normal Curves. Estimation Theory and Tests Of Significance: Idea Of Sample And Population; Estimation of Population, Parameters; Testing The Estimates Of Population Parameters: Sampling Distribution And Standard Error; Sampling Of Attributes; Test Of significance For Single proportion; Test Of Significance For Single Mean; Student's-Distribution.
  
9. **Chi- square Test:** Introduction; Test Of Goodness Of Fit.
  
10. **Correlation And Regression:** Introduction: Correlation analysis; Regression analysis.

**Text Book:**

Statistical Method For Research Workers: Sukhminder Singh Et Al: Kalyani Publishers, New Delhi.

**References:**

- A basic Course In Statistics: B.M. Clarke And D. Cooke; Elbs (u.K)
- Basic Statistics; B.L Agrawal: Wiley Eastern
- Elements Of Statistical Reasoning: Minimum And Clarke: Johnwiley And Sons.
- Statistics For Management: Levin, Prentice Hall Of India

**Numerical Methods Of Computation**

BCA 254 CS

Year: II

Semester: II

Teaching schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal Assessment		Final		Total
3	0	2	Theory	Practical*	Theory **	Practical	100
			20	20	60	-	

\* Continuous

\*\* Duration: 3 Hrs

**Objective:**

This subject aims that enabling students to (a) Solve nonlinear equations (b) use interpolation (c) fit curves (d) solve linear equations (e) Integration and differentiation using numerical methods through computers.

**Content:**

1. **Errors in Numerical Computation:** Representation of Numbers in a computer; sources of error, error in addition and subtraction; floating point arithmetic: General Formula of Errors.
2. **Solution of Nonlinear Equations:** Introduction. The Bisection Method; The Method of False Position; Newton Raphson Method; Solution Of system of nonlinear Equations.
3. **Interpolation:** Introduction; Errors in Polynomial Interpolation; Finite Differences (Foreward, Backward, Central differences, symbolic relations): Detection of errors by use of Difference, symbolic Relations; Detection of errors by use of Difference Tables: Newton's formula for Interpolation; Central Difference Interpolation Formula (Gauss: Stirling's Bessel's and Everett's Formulae); Interpolation with unevenly spaced points (Lagrange's and Newton's Interpolation Formulae)
4. **Curve Fitting:** Method of least squares:
5. **System of Linear Equations:** Contingency of a Linear system of Equations; Solution of linear system- Direct Method. Matrix inversion, Gaussian Elimination Method of Factorization, Method of Iteration (Jacobi & Gauss- Seidel iteration): 111 conditioned system; Matrix Eigenvalues.
6. **Numerical Integration and Differentiation:** Numerical Differentiation; Numerical Integration (Trapezoidal Rule, Simpson's 1/3 rule, 3/8 rule): Romberg Integration: Numerical Double Integration.
7. **Numerical Solution of Ordinary Differential Equations:**  
**Introduction; Euler's Method:** Modified Euler's Method: Rungekutta Methods; Simultaneous and higher order equations; Boundary Value Problem (Finite Difference Method)

Text Book

S.S Sastry- Introductory Methods of Numerical Analysis, - Prentice- Hall India

**References:**

1. S. S Sastry- Engineering Mathematics Volume two, Prentice – Hall of India



**VISUAL AND WINDOWS PROGRAMMING  
BCA 255 CS**

Year: II

Semester: II

Teaching schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal Assessment		Final		Total
3	1	2	Theory	Practical*	Theory**	Practical	100
			20	20	60	-	

\* Continuous

\*\* Duration: 3 Hrs

**Objective**

The main of the course is to promote a good foundation in GUI basics, rational and standards, windows programming techniques etc. through assignments and projects.

**Contents:**

1. **Introduction to Window concepts:** What is windows, Historical perspective of User Interface , difference Between Window Program and DOS or UNIX program, Windows Programming model, Memory Model, Static and Dynamic Linking. Windows Memory Management
2. **A skeletal Windows application:** The Skeleton Application Source Program, The Winmain Function, Registering the Windows Class, Winmain's Message Loop, Windows Function, About Dialog Function, Components of the Skeleton application.
3. **Displaying text in window:** Device & Display Context (WM-PAINT, Text Out, Logical Coordinates & Device Coordinates), Introduction to Scroll Bar (Parts of a Scroll Bar), Sub-Classing a Window Class (Sub-Classing, Sub-Classing Technique)
4. **Examining a Device Context in Depth:** What is Device Context (DC), Specific Types of Display Context, Display Context (Common Display Context, Less Display Context, Private Display Context & Window Display Context), Attributes of a Display Context (Colors, Defining Color, Bitmap, Brush, Pen & Regional Attributes & Objects)
5. **Graphical Output: (Pixels, Lines & Polygons):** Getting & Setting the Class of a Pixel, Drawing Lines & Pages, Drawing Modes, Drawing Filled Areas- Rectangle & Ellipses, Drawing & Filling Polygons)
6. **Keyboard, Mouse and Timer Input:** Keyboard: (Input, Interfaces, Press & Release Message), Vertical Key Code, Character Message, Character Sets)

Mouse: (Mouse Input, Mouse Messages Hit Testing, Capturing the Mouse, Simple Drop & Drag)

Timer: (Timer Input, Sending WM\_Timer Message, Using Timer)

7. **Using controls:** Overview, Static, Button AND Edit Classes, Creating & Centralize Window, Control Notified Button Class, Check Boxes, Radio Button Edit Class (Style, Message to Edit Control, Working with Selection)
8. **Using controls:** list box, combo box, image list and tree view classes, dialogue boxes
9. **Dialog Box:** What is Dialog Box, Dialog Function & Cell Book, Function, Creating Model & Modeless Dialog Box)
10. **Menu and Icons: Menu (Defining & Creating Dropdown & Popup Menu), Icons (Defining, Loading, Displaying)**
11. **Printing:** Overview of Printing Process using Default & Installed Printers, Getting the Printers Determining Device Mode Value, Exempla Printing Document)
12. **Memory management:** Dynamic Memory Allocation, (Fixed Movable & Discarded Memory, Block Managing Memory, Block Using the Global Function, Allocating Fix Memory Book Allocating Movable Memory Block, Allocating Discardable Memory Block), Locking & Unlocking Memory Blocks, Reallocating Framing Memory Block.

Lab Exercises:

There shall be above thirty lab exercises covering all the topics.

**Textbook:**

Brent E Rector and Joseph M Newcomer, Win32 programming, Addison Wesley, 1999.

**References**

Charles Petzold, Programming Windows 95. Microsoft Press. 1996.

Richard J. Simon. Windows NT Win32 API Super Bible SAMS. 1997.

**TECHNOLOGY AND OPERATIONAL MANAGEMENT  
BCA 256MS**

Year: II

Semester: II

Teaching schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal Assessment		Final		Total
3	1	2	Theory	Practical*	Theory**	Practical	100
			20	-	80	-	

\* Continuous

\*\* Duration: 3 Hrs

**Objective:**

The basic objective of this course is to provide students with the fundamental Knowledge of Technology and operation function of an organization.

**1. Nature and Concept of Operation Management:**

- What is operation management
- Difference and similarities between manufacturing and services.
- Operation management and organization
- A case study of successful Japanese owned facilities in United States.

**2. Operation Strategy**

- Corporate strategy
- Market analysis
- Competitive priorities
- Flow strategy
- Flow strategy and competitive priorities
- Breakeven analysis
- Preference matrix

**3. Process Management**

- Major process decision: Process choice, Vertical integration, resource flexibility, capital intensity
- Relationship between decisions

**4. Management of Technology**

- Meaning and Role of Technology
- Information Technology

**5. Total Quality Management**

- Quality as a management philosophy
- Employee involvement
- Continuous improvement
- The cost of poor quality
- Improving quality through TQM
- A case study of Cranston Nissan

**6. Capacity**

- Measures of capacity

**7. Location**

- Factor affecting location decisions

**8. Layout**

- Layout types

**9. Forecasting**

- Concepts
- Judgement methods
- Casual method: Linear regression
- Time series methods.

**10. Material requirement planning**

- Inputs to material requirement planning
- Planning factors
- Outputs from material requirement planning

**11. Just in time system**

- Characteristic of just in time system
- The KANBAN system

**Test Books**

1. Krajewski, Ritzman, Operation Management, Strategy and Analysis, Addison- Wesley Publishing Company

**Reference Books**

1. Elwood, S. Buffa, Rakesh Sarin, Modern Production/ Operation Management, John Wiley and Sons
2. James B. Dilworth, Production and Operations Management. McGraw Hill Publishing Company
3. Everett E. Adam Jr., Ronald J. Fbert, Production and Operation Management, Prentice – Hall of India Pvt. Ltd.

**COMPUTER PROJECT  
BCA 257**

Year: II

Semester: II

Teaching schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal Assessment		Final		Total
-	1	3	Theory	Practical*	Theory **	Practical	100
			-	40	-	60	

\* Continuous

\*\* Duration: 3 Hrs

**Objective:**

After finishing this project, students will be able to develop application software using oracle developer 2000

**Contents:**

A total 60 lab hours covering all features of oracle developer 2000 will be assigned to every student.

Every group consisting of three students will be assigned a project work related to developing application software using oracle developer 2000.

Even though mention above, the project includes D2K and Oracle, Project work can be conducted using any front-end tool and any back-end database.

**BCA - Fifth Semester**

**CS Software Engineering**  
**BCA 301 CS**

**Year III**

**Semester I**

Teaching Schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal Assessment		Final		Total
3	1	-	Theory	Practical*	Theory **	Practical	100
			20	-	80	-	

**\* Continuous**

**\*\*Duration: 3 hours**

**Objective:** This course would provide this student with an overview of software engineering,

And would enable to understand and appreciate following:

- The role and important of software engineering in system development.
- Concept and techniques of requirements engineering, specification, design and implementation of software.
- Concept and techniques of software testing and quality assurance.
- The important of software metrics and estimation in software projects management.
- Role of automation software engineering.

**Contents:**

**PART I: Introduction (3hrs)**

**1. Software Products**

- a. The evolving role of software
- b. Software characteristics, Software application and Myths

**2. Software Process (6 hrs)**

- a. Software Engineering: A layered Technology, Process, Methods, Tools, Generic view of Software Engineering
- b. The software Process
- c. Software Process Model
- d. The Linear sequential model or Waterfall model
- e. The Prototyping model
- f. The RAD model
- g. The evolutionary software process model (Increment model, Spiral model)
- h. Component base development

**3. Introduction to System Engineering (2 hrs)**

- a. A Computer based system
- b. Hierarchy
- c. System Modeling

**4. Introduction to Software Project Management (4 hrs)**

- a. Project Planning

- b. Activity Organization
- c. Project Scheduling

**PART II: Software Requirements and Specification (6 hrs)**

- 5. Requirement Engineering
- 6. Requirement Analysis
- 7. Viewpoint oriented methods
- 8. Overview of data modeling and flow diagram
- 9. Software Prototyping techniques
- 10. Requirements definition and specifications.

**PART III: Software Design:**

- 11. Introduction to software design (3 hrs )
- 12. The Software Design Process (3 hrs )
  - a. Design Strategy, Concepts
  - b. Design and Software quality
- 13. Software Architecture (3 hrs )
  - a. Introduction
  - b. Types of SA

**PART IV: Software Testing:**

- 14. Software Testing Fundamentals (2 hrs )
  - a. Test Case Design
- 15. Black box Testing (2 hrs )
- 16. White box testing (2 hrs )
- 17. Software Testing Strategies (2 hrs )
  - a. Verification and Validation
  - b. Test Planning
- 18. Software Quality (2 hrs )
- 19. Software Process and Projects Metrics (5 hrs )
  - a. Measures, Metrics and Indicators
  - b. Metrics in the process and projects
  - c. Software Measurement
  - d. Metrics for software quality

**TEXT BOOK:**

- 1. T1: Pressman, R.S. Software Engineering: A Practitioner's Approach, McGraw-Hill, 5<sup>th</sup> edition 2000

**REFERENCES:**

- a. Sommerville, I. Software Engineering, Addison-wasley, 5<sup>th</sup> ed., 1996
- b. Behforooz , A, and F. Hudson, Fundamentals of Software Engineering, OUP, 1996
- c. Jalote, P., An Introduction to software Engineering, Narosa, 1991



**Web Technologies**  
**BCA 302 CS**

<b>Year III</b>			<b>Semester I</b>				
Teaching Schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal Assessment		Final		Total
3		3	Theory	Practical*	Theory **	Practical	100
			20	20	60	-	

\* **Continuous**

\*\***Duration: 3 hours**

**Objective:** To expose students with client and server side web programming.

**Contents:**

1. **Introduction:** **(4 hrs )**  
Review of web technology, Review of HTML and JAVA script.
  
2. **Issues of Web technology:** **(6 hrs )**  
Architectural Issues of web layer, HTTP, FTP Protocols, Tier technology, 2- Tier, 3- Tier and n- Tier.
  
3. **The Client Tier:** **(12 hrs )**  
Representing content, XML, DTD's schemas, style sheets and Transformation, CSS, XSL/XSLT Client-side programming.
  
4. **The Server Tier:** **(13 hrs )**  
Web server Concept, Creating dynamic content, Using control flow to control dynamic control generation, Sessions and State, Error handling, Authentication, Architecting web application; Using tag libraries, Writing tag libraries.
  
5. **Introduction to Advanced Server side issues:**

**Laboratory Exercises:** The laboratory should cover all topics mentioned above.

**Reference Books:**

1. David Hunter, Beginning XML, Rocks Publication
2. Eric A. Smith, ASP 3 Programming bible, IDG Publication.

**BCA 303 CS Object Oriented Analysis & Design**  
**BCA 303 CS**

<b>Year III</b>			<b>Semester I</b>				
Teaching Schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal Assessment	Final		Total	
3	1	-	Theory	Practical*	Theory**	Practical	100
			20	-	80	-	

\* **Continuous**  
 \*\***Duration: 3 hours**

**Objectives:** The course aims at teaching analysis and design using Object Orientation. It aims to deal with essential concepts of object orientation such as objects, classes, messages, encapsulation, data abstraction, inheritance etc. The course uses the analysis and design method developed by UML

**Contents:**

- 1. Complexity:** Inherent Complexity of Software, Structure of Complex System. Bringing order to Chaos. Design Complex System. **( 4 hrs )**
- 2. The Object Model:** Evolution of Object Model, Elements of Object Model, Applying the Object Model **( 4 hrs )**
- 3. Classes and Objects:** The Nature of an Object. Relationship among Objects. The Nature of a class. Relationships among classes. Classification The Important of Proper Classification. Identity Classes and Objects. Key Abstractions and Mechanisms. **( 12 hrs )**
- 4. The Notation:** Elements of Notation. Class/State Transition/Objects/interaction/Module /Process Diagrams, UML **( 12 hrs )**
- 5. The Process:** First Principles. The Micro Development Process. Macro Development Process. **( 2 hrs )**
- 6. Pragmatics:** Management & Planning Staffing. Release Management Reuse Quality Assurance & Metrics. Documentation. **( 3 hrs )**
- 7. Applications:** Data Acquisition, Weather Monitoring Station, Frameworks: Foundation Class Library, Client/Server Computing: Inventory Tracking **( 8 hrs )**
- 8. Case Study:**

**TEXT BOOK**

- Booch, G. Object-oriented Analysis and Design with Application. Addison Weseley, 2<sup>nd</sup> Ed., 1994

**REFERENCES:**

1. Rebecca Wirfs-brock et al., Designing Object-Oriented Software. PHI. 1996.
2. Rumbaugh Jet al Object-Oriented Modeling and Design, Prentice Hall, 1991.

**Advance Programming**  
**BCA 304 CS**

**Year III**

**Semester I**

Teaching Schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal Assessment		Final		Total
3	-	3	Theory	Practical*	Theory **	Practical	100
			20	20	60	-	

\* **Continuous**

\*\***Duration: 3 hours**

**1. Basics:** Overview of object-oriented programming, Introduction to Java, Features of Java, Control Statements, Looping, Arrays, Strings, and Vectors, Classes, Objects, and Methods, Interface, Packages, Exceptional Handling, Multithreaded Programming. **(12hrs)**

**2. Applet Programming:** Introduction, Standard Applet Methods, Putting an Applet on a web Page, Passing parameter to Applets. **(3 hrs)**

**3. GUI Programming:** Introduction to AWT and Swing, Using Swing Components, Using Atomic Components, J label, J Button. **(5 hrs)**

**4. Multimedia Programming:** 2D and 3D Graphics, Audio and Video Features, Animation. **(5 hrs)**

**5. Java INPUT/OUTPUT:** **(5 hrs)**

**6. JDBC:** JDBC Basics, Setting up a database, Setting up a Connection, Retrieving Values from Result Sets, Updating tables. **(4 hrs)**

**7. Socket Programming:** Server- side Programming, Client- Side Programming. A Simple Programming. **(5 hrs)**

**8. Distributed Applications:** Introduction to Distributed Objects, Overview of RMI, Creating Distributed Application using RMI. **(6 hrs)**

**Lab Exercises:** There shall be at least 30 lab exercises.

**References Books:**

1. Thinking in Java (Bruce E Kce)
2. How to program Java (D&D)
3. Core Java 1 (Sun)
4. Core Java 2 (Sun)

**Computer Graphics**  
**BCA 305 CS**

**Year III**

**Semester I**

Teaching Schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal Assessment		Final		Total
3	-	2	Theory	Practical*	Theory**	Practical	100
			20	20	60	-	

\* **Continuous**

\*\***Duration: 3 hours**

**Objectives:** The aim of this course is to introduce the concepts of computer graphics. Emphasis will be given to theoretical and algorithmic aspects of computer graphics.

**Contents:**

1. **Introduction:** History of Computer Graphics. Application of Computer Graphics. **(3 hrs)**
2. **Graphics Hardware:** Mouse (Mechanical and Optical), Keyboard, Light pen, Touch panel (Optical, Sonic and Electrical) and Tablets (Electrical, Sonic, Resistive). Monochromatic and Color CRTs. Raster and Vector Display Technology. **(6 hrs)**
3. **Two Dimensional Algorithms and Transformations:** Line drawing algorithms: Digital differential analyzer (DDA) algorithm, Bresenham's algorithm. Two-Dimensional geometric transformation (Translation, Standard Rotation, Pivot- Point Rotation, Standard Scaling. Fixed Pint Scaling, Directive Scaling, Reflection, Shear). Windows- to- View port transformation. Bezier Curve, filling (Scan converting, flood fill for polygon only) Clipping lines and polygons (Sunderland line clipping Algorithm) **(12 hrs)**
4. **Three- Dimensional Transformations:** Three -Dimensional geometric transformations (Translation, Rotation, Scaling, Reflection, Shear). Three-dimensional object representation (Polygon surfaces, Polygon Tables, Polygon Meshes). Three-Dimensional world to screen perspective viewing transform. Hidden line and hidden surface removal techniques (Plane equation method, Dept Buffer method, Scan Line method). **(12 hrs)**
5. **Illumination Model, Surface Rendering Techniques and Shading Methods:** Illumination Models. Phong Model. Polygon Rendering Method constant Shading method, Gourmand Shading Method. Phong Shading method. Fast Phong Shading method. **(1 hrs)**
6. **Animation:** Introduction **(1 hrs)**

**Text Book:**

1. T I James D. Foley, A. Van Dam. S.K Feiner, and J.F. Hughes: Computer Graphics, Principles and practice.
2. D. Harn and M.P.Baker: computer Graphics, P.H.I.

**Laboratory:**

1. Hardware introduction, CRT tubes.
2. Line drawing algorithm using DDA
3. Line drawing algorithm using Bresenham's (0-450)
4. Create user define line function such that it draw line for any slope.
5. Create user-defined function using Bresenham's mid point circle algorithm such that it draws circle.
6. Implement Bresenham midpoint circle algorithm.
7. Implement Bresenham midpoint ellipse algorithm.
8. Fill rectangle using scan conversion methods.
9. Fill polygon using scan conversion methods
10. Fill polygon using scan conversion methods for concave polygon.
11. Create library functions Such that it fills all types of Polygon using scan-converting method.
12. Fill all types of primitives by using flood fill algorithm.
13. 2 D translation.
14. Program to rotate any primitive about pivot point.
15. Program to reflect the object about any axis. X-axis, y-axis, and about line  $y=mx+c$
16. Program to shear the object.
17. Repeat 13 to 16 for 3D primitives.
18. Program for animation.
19. Shading. Rendering to be done by VC++ adding extra library files gc.up, gc.h, and glut.h

**APPRENTICE PROJECT I**  
**BCA 307 CS**

<b>Year III</b>			<b>Semester I</b>				
Teaching Schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal Assessment		Final		Total
-	-	6	Theory	Practical*	Theory **	Practical	100
			-	40	-	60	

**\* Continuous**

**\*\*Duration: 3 hours**

**Objectives:** After completing this subject, students will be able to apply the concept of system Analysis and system design required for development a computer information system for a Real life industrial situation.

**Contents:**

Students will work individually or in pairs on a project of their choice, mostly related to Development of a computer information system for a life industrial situation.

In some cases students will be asked to visit software development firms where they will Involve themselves in using system analysis and design tools required during software Development process.

At the end of the semester they will be required to document their reports, which will be Individually, assessed by their advisors.

Every students will have to appear for a viva voice at the end the semester.

**BCA - Sixth Semester**



**Management Information System**

BCA 351 CS

Year: III

Semester: II

Teaching schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal Assessment		Final		Total
3	1	-	Theory	Practical*	Theory**	Practical	100
			20	-	80	-	

\* Continuous

\*\* Duration: 3 Hrs

**Objective:**

This subject aims at equipping the students with the knowledge of Management Information System and other different types of Business oriented computer information systems.

**Contents:**

1. **Introduction to Information System:** (4 Hrs)  
 Information System verses Information Technology, Computer Literacy verses Information Literacy, Data verses Information, Need of MIS for students and organization.
2. **Information System for Managerial Decision-Making:** (5 Hrs)  
 Transaction Processing System, steps in processing a transaction, Management Information System, ISS, DEE, EIS, AI and ES, OAS, Tapping the potential of information system.
3. **DSS and EIS:** (6 Hrs)  
 Application of DSS, component of a DSS, function DSS, GDSS EIS, characteristic of an EIS, critical success factor of DSS/EIS.
4. **AI, ES and Neural Networks:** (7 Hrs)  
 Appropriate areas for an ES, Application of ES, Component of ES, knowledge representation, Neural networks.
5. **Office Automation:** (2 Hrs)  
 The virtual corporation types of OAS, Communication System.
6. **Business Information System:** (6 Hrs)  
 Functional Information System, Manufacturing Information System, Quality Information System, Financial and Accounting Information System, Developing Cross-Functional System.
7. **Strategic Information System:** (5 Hrs)  
 Definition of Strategic Information System, Characteristic of Strategic Information System, Strategies for Developing an SIS, Potential Barriers to Developing an SIS, Case Studies in SIS.

8. **Managing Information Resources:** (4 hrs)  
Definition of IRM, Principal of Managing Information Resources,  
Objectives of IRM, IRM function and case study coppers embraces the  
age of technology.
9. **Computer Security:** (6 Hrs)  
Definition of Computer Security, Security Control, and Disaster Recovery  
Plans, Developing a Disaster Recovery Plan.

**References:**

1. UMA G Gupta: Management Information System, A Managerial  
Perspective, Galgotia Publication Pvt. Ltd.
2. Larry Long: Management Information System, PHI

**Network Programming**

BCA 352 CS

Year: III

Semester: II

Teaching schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal Assessment		Final		Total
3	1	3	Theory	Practical*	Theory **	Practical	100
			20	20	60	-	

\* Continuous

\*\* Duration: 3 Hrs

**Objectives:**

At the end of this course, the students would be able to design and implement network client server applications.

**Contents:**

- 1. Introduction to Network Programming: **5 hrs****  
**Introduction to Computer Network:** Client /Server Model, Protocol Suite (ISO/OSI, TCP/IP), Unix Standards (POSIX, Open Group, IETF), Network Utilities (telnet, netstat, ifconfig, ping, ftp)  
**Introduction to Programming:** Programming Standards, Wrapper functions, Header files, libraries and program documentation.
- 2. Elementary Operating System Calls: **5 hrs****  
**Elementary Operating System Calls:** fork, exec and its family, waitpid, wait, pipes, fifo, signals (SIGCHLD, SIGINT, SIGIO), read, write, readn, writen.
- 3. TCP/UDP Transport Layer Protocols: **4 hrs****  
**TCP (Transmission Control Protocol):** features, connection establishment and termination, states in communication (LISTEN, TIME\_WAIT, ESTABLISHED, BLOCKED)  
**UDP (User Datagram Protocol):** features, uses, comparison with TCP.  
**TCP and UDP Buffer sizes and limitations.**
- 4. Elementary Socket Calls: **4 hrs****  
**Socket Address Structure:** for IPV4, IPV6, UNIX domain socket and Generic socket address structure, Value-result argument.  
**Byte Ordering and manipulating function:** htonl, htons, ntohl, ntohs, inet\_addr, inet\_aton, inet\_ntoa, inet\_pton.
- 5. TCP Socket Calls : **4 hrs****  
 Socket, function, connect function, bind function, listen function, accept function, close function, getsock\_name and get\_peer\_name function (Example: echo server and client).
- 6. I/O multiplexing with select & Poll: **3 hrs****  
**I/O models:** Blocking I/O, non-blocking I/O, I/O multiplexing, signal driven I/O (SIGIO) and Asynchronous I/O model.  
 Introductions to select function, shutdown function and poll function.

- 7. Socket Options: 2 hrs**  
Getsockopt and setsockopt functions, Generic IPV\$ socket options, TCP socket options.
- 8. UDP Sockets Calls for data transmission and connection: 3 hrs**  
Socket calls recv\_from and send\_to functions, UDP client with connect, Determine outgoing interface with UDP.  
Protocol Independent Services.
- 9. Name and Address Conversion: 2 hrs**  
**Basic Name and Address Conversion Function:** Review of Domain name system, gethostbyname, gethostbyaddr, uname function, getservbyname and getservbyport function.  
**Other I/O functions:** recv, send, readv, writev, recvmgsndmsg, socket timeouts and data handling.
- 10. Unix Domain Protocol: 3 hrs**  
Unix Domain socket address structure, socket pair function, socket functions, UDP Stream Client/Server, Unix domain datagram, passing descriptor.
- 11. Client and Server Design Alternative: 2 hrs**  
TCP Client Alternative, Iteration Server, Concurrent server, Networked servers.
- 12. Daemon processes, Inetd super servers: 2 hrs**  
Sysloged (syslog function), daemon\_init function, inetd daemon.
- 13. Broadcast and Multicast: 3 hrs**  
Introduction, Broadcast and Multicast addresses, comparison between broadcast, unicast and Multicast socket options.
- 14. IP Layers and Raw Socket: 3 hrs**  
Introduction, Raw socket creation, Input and Output (ping example).
- Lab Exercise:** Laboratories of elementary or system calls, TCP and UDP socket including select and poll, socket options and name conversion strictly using c/c++ and Linux.
- Class project:** Project class includes the project covering the advanced topics in Windows / Linux / Unix Environment using java/c/c++.

**Text books:**

1. Stevens W.R., "Unix Network Programming", Vol-1.
2. Stevens W.R., "Unix Network Programming", Vol-II
3. Doglous E. Comer, "Internetworking with TCP/IP", Vol - III

**E-Commerce**

Year: III

Semester: II

Teaching schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal Assessment		Final		Total
3	1	3	Theory	Practical*	Theory**	Practical	100
			20	20	60	-	

\* Continuous

\*\* Duration: 3 Hrs

**Objectives:** To introduce the concept, technologies and strategies of electronic commerce. The students will be familiarized with the various business models, infrastructures for implementing online business such as cataloging, order processing, electronic payment modes, online advertising and security.

**Course Content:**

**1. Introduction to E-Commerce: (5 hrs)**

E-commerce fundamentals, Media Convergence, Benefits of E-Commerce, Internet's influence on Market and Prices, Overview, Benefits of E-commerce, Internet's influence on Market and Prices, Overview of Just In Time and Quick Response Retailing Inventory, Overview of Supply Chain Management.

**2. Internetworking and E-Commerce: (7 Hrs)**

History of Internet, Overview of Internet Infrastructure, IP Suite, Domain Name Service, ISPs and Connectivity options, Firewalls and Network Security.

**3. Web Technologies: (6 hrs)**

Importance of website design, Introduction to Dynamic web pages, Properties of a good E-commerce site, common protocols like HTTP and FTP.

**4. Business Models: (3 hrs)**

Fundamentals of Brokerage, Advertising, Infomediary, Merchant, Manufacturer, Affiliate, Community, Subscription and Utility Models, B-2-B and B-2-C.

**5. Electronic Payment Systems: (8 hrs)**

Types of Payment Systems, Properties of paper money, Electronic cash and its use, Electronic Checks, Smart Cards, Credit cards, Online credit card processing, Retailing in E-commerce.

**6. Security and Encryption: (7 hrs)**

E-commerce Security Threats, Virus, Fundamentals of Symmetric and Public Key Cryptography, Digital Signature, Digital Certificate, Certification Authority.

**7. Marketing and Advertising: (8 hrs)**

How to be found and to find in the Internet, Personalization, Virtual Societies, Localization, Banner Ads, User Tracking and Log file analyzing, Push and Pull advertising, Launching a new Product.

**8. Other Issues in E-commerce: (3 hrs)**

Intellectual property: patent, Copyright law

Governance: E-commerce Laws, Internet governing Organizations, Cross-border legal issues.

**Lab:** The students are expected to complete a mini-project implementing the strategies and technologies learnt in the theory classes and develop an e-commerce website.

**References:**

1. Kalakota & Whinston, "Frontiers of Electronic Commerce". Pearson Education (Addison-Wesley), 2000, ISBN: 981-235-903-6.
2. Daniel Amor, "The E-business (R)evolution", Pearson Education, 2000, ISBN: 981-405-826-2.

**IT-Presentation**

BCA 354 CS

Year: III

Semester: II

Teaching schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal Assessment		Final		Total
-	-	3	Theory	Practical*	Theory**	Practical	100
			-	100	-	-	

\* Continuous

\*\* Duration: 3 Hrs

**Objective:** After completing this subject, students will be able to write a report on Information Technology and present it in seminar. This course aims at developing writing and presentation skill in front of a mass.

**Contents:**

Seminar in the advancement of Information Technology or new, research that may affect information theory will be prepared and presented by every student. There may be experts in specialized areas from the government, private or educational sector lecturing on specialized topics. Students may be organized into groups for presentation activities on interesting topics.

**Apprentice Project II**

BCA 356 CS

Year: III

Semester: II

Teaching schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal Assessment		Final		Total
-	-	6	Theory	Practical*	Theory**	Practical	100
			-	40	-	60	

\* Continuous

\*\* Duration: 3 Hrs

**Objective:** After completing this project, students will be able to develop application software for an already analyzed and designed real life computer information system.

**Content:** Students will continue their project they did in Apprentice Project I.

At the end of the semester, students will prepare a report, demonstrate that they developed and finally appear for a viva-voce.



**Artificial Intelligence**

BCA 354 CS

Year: III

Semester: II

Teaching schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal Assessment		Final		Total
3	1	2	Theory	Practical*	Theory **	Practical	100
			20	20	60	-	

\* Continuous

\*\* Duration: 3 Hrs

**Objective:** After accomplishing this subject, students will acquire fundamental knowledge concerning problems and techniques of AI.

**Contents:**

1. **Introduction to Artificial Intelligence:** (5 Hrs)  
The foundation of AI  
History of AI
  
2. **Intelligent Agent:** (6 Hrs)  
Introduction  
Agent Behavior  
Structure of Intelligent Agents  
Agent program  
Types if Agent Program  
Environment.  
Properties of Environment
  
3. **Problem Solving:** (15 Hrs)  
Solving problem by searching  
Problem solving Agents  
Formulating Problems  
Knowledge and problem Types.  
Searching for solution  
Search Strategies  
Breadth-first search  
Uniform cost search  
Depth first search  
Depth limited search  
Iterative deepening search  
Bi-direction search.
  
4. **Informed Search Method:** (4 Hrs)  
Best First Search  
Heuristic Function

- 5. Knowledge and reasoning:** (7 Hrs)  
Agent that Reason Logically.  
A Knowledge based Agent  
Propositional Logic
- 6. Planning:** (3 Hrs)  
A Simple Planning Agent  
Problem Solving to Planning.
- 7. Learning:** (2 Hrs)  
Learning from observation
- 8. Introduction to Natural Language Processing :** (3 Hrs)  
Introduction  
Syntactic Processing  
Semantic Processing

Laboratory Work: **It should cover general searching algorithms and knowledge representation.**

Textbook:

- 1. Stuart Russell, Peter Norvig, "Artificial Intelligence", Pearson Education.**

References:

- 1. Patrick Henry Winston, "Artificial Intelligence", Pearson Education.**
- 2. G.F. Luger & W.A. Stubblefield, "Artificial Intelligence", Benjamin Cummings, 1993.**