Scheme of Examination and Syllabus

For

Bachelors of Computer Applications

Batch 2018 – 2019
Onwards

SGT University, Gurgaon, Haryana

SGT University, Gurgaon, Haryana

Scheme of Bachelor of Computer Applications for Batch 2018-2019onwords

Bachelor of Computer Applications Semester – I

Paper Code	Title	L	T	P	Total	Int	Ext	Total	Credits
	Computer Basics and PC Software	3	1	-	4	40	60	100	4
	Computer Hardware & Trouble shooting	3	-	-	3	40	60	100	3
	Basic Mathematics	3	1	-	4	40	60	100	4
	Communication & Soft Skills	4	-	-	4	40	60	100	4
	Business Organisation	4	-	-	4	40	60	100	4
	Word Processing Lab	-	-	4	4	40	60	100	2
	PC Assembling And Trouble Shooting Lab	-	-	4	4	40	60	100	2
	Total	**17**	**2**	**8**	**27**	**280**	**420**	**700**	**23**

Bachelor of Computer Applications Semester – II

Paper Code	Title	L	T	P	Total	Int	Ext	Total	Credits
	Basic Accounting and Finance	4	-	-	4	40	60	100	4
	Computer Organization	4	-	-	4	40	60	100	4
	Communication & Soft Skills –II	4	-	-	4	40	60	100	4
	Discrete Mathematics	4	-	-	4	40	60	100	4
	Programming in C	4	-	-	4	40	60	100	4
	Computer Organization-Lab	-	-	4	4	40	60	100	2
	Programming in „C" Lab	-	-	4	4	40	60	100	2
	Colloquium	-	-	2	2	40	60	100	1
	Total	**20**	**0**	**10**	**30**	320	480	800	**25**

SGT University, Gurgaon, Haryana

Scheme of Bachelor of Computer Applications for Batch 2018-2019 onwords

Bachelor of Computer Applications Semester – III

Paper Code	Title	L	T	P	Total	Int	Ext	Total	Credits
	Data Structure using C	4	-	-	4	40	60	100	4
	Database Management System	4	-	-	4	40	60	100	4
	Programming in C++	4	-	-	4	40	60	100	4
	System Analysis & Design	4	-	-	4	40	60	100	4
	Programming in C++ Lab	-	-	4	4	40	60	100	2
	Data Structure using C: Lab	-	-	4	4	40	60	100	2
	Database Management Systems Lab	-	-	4	4	40	60	100	2
	Colloquium	-	-	2	2	40	60	100	1
	Total	**16**	**-**	**14**	**30**	320	480	800	**23**

Bachelor of Computer Applications Semester – IV

Paper Code	Title	L	T	P	Total	Int	Ext	Total	Credits
	Computer Networks	4	-	-	4	40	60	100	4
	Operating System	4	-	-	4	40	60	100	4
	Programming in Java	4	-	-	4	40	60	100	4
	Introduction to Algorithm Design	4	-	-	4	40	60	100	4
	Java Lab	-	-	4	4	40	60	100	2
	Operating System Lab	-	-	4	4	40	60	100	2
	Colloquium	-	-	2	2	40	60	100	1
	Seminar	2	-	-	2	40	60	100	2
	Total	**18**	**-**	**10**	**28**	320	480	**800**	**23**

SGT University, Gurgaon, Haryana

Scheme of Bachelor of Computer Applications for Batch 2018-2019 onwords

Bachelor of Computer Applications Semester – V

Paper Code	Title	L	T	P	Total	Int	Ext	Total	Credits
	Software Engineering	4	-	-	4	40	60	100	4
	Microprocessor and Interfacing	4	-	-	4	40	60	100	4
	Web Programming	4	-	-	4	40	60	100	4
	ERP and E-commerce	4	-	-	4	40	60	100	4
	Minor Project	-	-	4	4	40	60	100	2
	Web Programming Lab	-	-	4	4	40	60	100	2
	Microprocessor and Interfacing Lab	-	-	4	4	40	60	100	2
	Seminar	2	-	-	2	40	60	100	2
	Total	**18**	**-**	**12**	**30**	320	480	800	**24**

Bachelor of Computer Applications Semester – VI

Paper Code	Title	L	T	P	Total	Int	Ext	Total	Credits
	Artificial Intelligence	4	-	-	4	40	60	100	4
	Computer Graphics	4	-	-	4	40	60	100	4
	AI- Lab	-	-	4	4	40	60	100	2
	Computer Graphics Lab	-	-	4	4	40	60	100	2
	Major Project	-	-	8	8	100	100	200	8
	Seminar	2	-	-	2	40	60	100	2
	Total	**10**	**-**	**16**	**26**	300	400	700	**22**

Computer Basics and PC Software

L	T	P	Cr		External Marks: 60
3	1	-	4		Internal Marks: 40

Time Duration: 3 Hrs. **Total Marks: 100**

NOTE: Ten questions are to be set in all by the examiners by taking three questions from each unit and one compulsory question having 05 short answer type questions from all the units. Students will be required to attempt six questions in all including compulsory Question i.e. question No. 1 and by selecting not more than two questions from each unit.

OBJECTIVES
- To aware students about computer,its functions and utilities.
- To promote the development of computer-related skills for immediate application to other curricular areas;
- To provide a foundation for post-secondary education;
- To facilitate the development and application of problem-solving skills in students.

UNIT – 1

Computer Basics: Algorithms, A Simple Model of a Computer, Characteristics of Computers, Problem-solving Using Computers, Computer Generation & Classifications, Input & Output Devices.
The Data Representation: Data Representation, Number Systems, Decimal Representation in Computers, Alphanumeric Representation, Data Representation for Computation, Error Detection and Correction Codes.
Computer Memory: Memory Organization, Read Only Memory, Random Access Memory, Hard Disk, Compact Disk, Magnetic Tape Drives, Flash Drive.
Processor: Structure of Instructions, Description of a Processor, Machine Language and Instruction set. Processors used in desktops and lap tops, Specifications of processor, motherboard & chipset, memory, interface & capacity of hard disk & DVD drives, I/O ports for desktop and laptops.

UNIT – 2

Operating Systems: History and Evolution, Functions of OS.
Software: Software and its Types, Programming Languages.
Communications and Internet: Introduction to Computer Communications, Computer Networks, Types of Networks, LAN, MAN and WAN, Client and Servers, Host & Terminals, TCP/IP, World Wide Web, Hypertext, Uniform Resource Locator, Web Browsers, IP Address, Domain Name, Internet Services Providers, Internet Security, Internet Requirements, Web Search Engine, Net Surfing, Internet Services, Intranet.

UNIT – 3

MS Word: Menus & Commands; Toolbars & Buttons; Wizards & Templates; Page Views & layouts; Text Attributes; Paragraph & Page Formatting; Text Editing; Printing & various print options; Spell Check, Thesaurus, Find & Replace; Headers & Footers; Inserting – Page Numbers, Pictures, Files, Autotexts, Symbols; Columns, Tabs & Indents; Creation & Working with Tables; Margins & Space management; Mail Merge

MS Excel: Working with MS Excel; Workbook & Worksheets; Inserting, Removing & Resizing of Columns & Rows; Column Hiding, Splitting; Use of Formulas, Calculations & Functions; Cell Formatting including Borders & Shading; Different Chart Types; Printing of Workbook & Worksheets .

MS PowerPoint: Creating a New Presentation; Wizards; Slides & its different views; Inserting, Deleting and Copying of Slides; Handouts, Columns & Lists; Adding Graphics, Sounds and Movies to a Slide; Objects; Designing & Presentation of a Slide Show; Printing Presentations.

References :

1. P .K. Sinha, Fundamentals of Computers, BPB Publications
2. V. Rajaraman, Fundamentals of Computers, 3rd Edition , PHI Publications
3. Anita Goel, Computer Fundamentals, Pearson Education.
4. Computers Today, D. H. Sanders, Fourth Edition, McGraw Hill, 1988
5. Marmel, Elauue, MS Office Projects 2007, Wiley India

COMPUTER HARDWARE & TROUBLE SHOOTING

L   T   P   Cr   **External Marks: 60**
3   -   -   3   **Internal Marks: 40**

Time Duration: 3 Hrs.   **Total Marks: 100**

NOTE: Ten questions are to be set in all by the examiners by taking three questions from each unit and one compulsory question having 05 short answer type questions from all the units. Students will be required to attempt six questions in all including compulsory Question i.e. question No. 1 and by selecting not more than two questions from each unit.

OBJECTIVES
It is mandatory to know about various components of computers, its maintenance and assembly. Troubleshooting of Computer system should know to BCA students. Installation of various OS and software is essential part of this course.

UNIT – 1

Personal / Micro Computers : PC Main Parts: CPU Box, Monitor, & Peripherals [Keyboard, Mouse, Speaker] (A Brief introduction).Inside CPU Box: Motherboard, I/O Cards, Cables, Floppy Drivers, HDD, CD-Drive, SMPS (Brief introduction of each, with their function).
Mother Board: Study of Motherboard RAM, ROM, CMOS, POST, BUS, (Address, Data, and SYSTEM) Connections of various devices such as Display Adapter, Ports (Serial, Parallel, and USB) & Modem on the Mother Board. Importance of CPU Cooling, Motherboard Troubleshooting.

UNIT –2

Serial Devices: Key Board: Switches, Keyboard organization, Key board type, Wireless Keyboard Trouble shooting. Mouse: Mouse type- Scroll & Optical Mouse, Function Connecting Mouse, Troubleshooting Mouse. Ports, Modems

UNIT – 3

PC-Assembly and CMOS Setup and Troubleshooting: Types of PC"S (Desktop. Laptop. Palmtop. BIOS/ CMOS setting),Boot process and Power Supply, Observation of all parts of Floppy drives, HDD, CD, and SMPS. Identification of cables and computers. Mounting Motherboard in cabinet Installation of cards, devices and then connecting cables. Fitting of cabinet. CMOS – Setup Troubleshooting.

References :
1. Hardware bible By : Winn L Rosch, Techmedia Publications
2. Trouble shooting, maintaining and repairing PCs By :Stephon J Bigelow Tata McGraw Hill Publication
3. Modern all about printers By: Manohar Lotia, Pradeep Nair, Bijal Lotia BPB Publications.
4. The complete PC upgrade and maintenance guide By : Mark Minasi, BPB Publications.

BASIC MATHEMATICS

L	T	P	Cr		External Marks: 60
3	1	-	4		Internal Marks: 40

Time Duration: 3 Hrs.   **Total Marks: 100**

NOTE: Ten questions are to be set in all by the examiners by taking three questions from each unit and one compulsory question having 05 short answer type questions from all the units. Students will be required to attempt six questions in all including compulsory Question i.e. question No. 1 and by selecting not more than two questions from each unit.

OBJECTIVES
- To extend student"s mathematical maturity and ability to deal with abstraction and to introduce most of the basic terminologies used in computer science courses and application of ideas to solve practical problems.
- To develop logical and analytical skills of BCA students.

UNIT - 1

Set relations and functions: elements of set, methods of describing a set, types of set, Venn diagram, operations on sets, union, intersection and difference of set, Duality, partitioning of a set, trigonometric functions.

UNIT-2

Binomial theorem and principle of mathematics induction, Introduction to matrix, properties of matrix; evaluation of determinant, minor and cofactors and properties of determinant.
Statistics: introduction to statistics, collection, and tabulation of data, mean, median and mode.

UNIT-3

Linear Equations- Translating algebraic expressions, combining like terms solving linear equations: Addition property. Solving linear equations: Multiplication property, combining rules. Literal equations. Solving linear inequalities
Systems of Linear Equations - Systems of equations in two variables (addition/elimination).
Graphing Linear Equations - Linear equations in two variables. The Cartesian coordinate system. The graph of a linear equation, Slope Point-slope form of a line graphing linear inequalities.

References:
1. Refresher Course On Mathematics Vol: 2--- Manjit Singh
2. ABC Of Mathematics J.P Mahendru
3. Discrete Mathematical Structure with application to Computer Science, Tremblay J.P.and Manohar R, McGraw Hill.
4. Applied Discrete Structure of Computer Science, Doerr A & Kenneth L., Paperback Edition, Galgotia Publications

BCA 1st Semester
COMMUNICATION & SOFT SKILLS

L	T	P	Cr		**External Marks: 60**
4	-	-	4		**Internal Marks: 40**

Time Duration: 3 Hrs.   **Total Marks: 100**

NOTE: Ten questions are to be set in all by the examiners by taking three questions from each unit and one compulsory question having 05 short answer type questions from all the units. Students will be required to attempt six questions in all including compulsory Question i.e. question No. 1 and by selecting not more than two questions from each unit.

Objectives:
- To encourage the all round development of students by focusing on Soft Skill.
- To make student aware about the importance, the role and the content of soft skill through instruction, knowledge acquisition, and practice.
- To develop and nurture the soft skills that help develop student as a team member, leader, and all round professional in long run have been identified and listed here for references.

UNIT-1

Business Communication: Meaning and definition, its importance, process, types, channels, principles of effective communication and barriers to communication.
Listening skill: Difference between listening and hearing, barriers to listening, listening exercises

UNIT-2

Speaking skills: Just a minute, extempore speaking and Group Discussion Sessions.
Reading & writing skills: Reading comprehension, Paragraph writing, Formal letter writing, Leave Application, Permission Letter, notice writing, memorandum writing, email etiquette and advertisement.

UNIT-3

Presentation skills: Preparation of presentation, strategies for effective presentation.
Vocabulary Building: Technical words, antonyms, synonyms
Sentence Syntax: Active and Passive Voice, Narration, Transformation of sentences, sentence correction.

Reference Books
1. Communication Skill for Effective Mgmt., Ghanekar, EPH
2. English for Technical communication, Laxminarayanan, Scitech
3. Simon Sweeney, "English for Communication", CUP.
4. Leo Jones and Richard Alexander, "New International Business English", CUP.

BUSINESS ORGANIZATION

L	T	P	Cr		External Marks: 60
4	-	-	4		Internal Marks: 40

Time Duration: 3 Hrs.   **Total Marks: 100**

NOTE: Ten questions are to be set in all by the examiners by taking three questions from each unit and one compulsory question having 05 short answer type questions from all the units. Students will be required to attempt six questions in all including compulsory Question i.e. question No. 1 and by selecting not more than two questions from each unit.

OBJECTIVE
Knowledge on the principles of management is essential for all kinds of people in all kinds of organizations. After studying this course, students will be able to have a clear understanding of the managerial functions like planning, organizing, staffing, leading and controlling. Students will also gain some basic knowledge on international aspect of management.

UNIT-1

Management: Nature and scope ,Planning: - Nature, Types, Steps in planning, the process of planning, setting of objectives, strategies policies and planning premises, the process of decision making.Organizing: nature, Process of organizing, departmentation, line and staff arrangement, organization structure and design, project and matrix organization, authority, decentralization, delegation, creating an effective span of management.

UNIT-2

Need, recruitment and selection techniques, types of interview co-ordination: Need and importance, types and techniques. Controlling: Control process, control techniques.

UNIT-3

Directing: - Conception, motivation, communication and leadership. Introduction of the following function Areas: Production: Production systems Production planning and control, work study HRD: Concept, different functions of HRD

Reference
1. Chabbra: Business Organization and Management
2. T.N.Prasad: Principles & Practice of Management
3. L.M.Arun Kumar & R. Sharma: Principles of Business Management
4. Koontz & O" Donnell: Essentials of Management
5. Stephen P. Robbins Management

BCA 1st Semester
WORD PROCESSING LAB

L   T   P   Cr   **External Marks: 60**
-   -   4   2   **Internal Marks: 40**

                                                                              Total Marks: 100

MS WORD
a.   Adding text, editing text, finding and replacing text, formatting text, character/line/paragraph spacing, working with styles and text indentation.
b.   Saving document with and without password.
c.   Working with page layout, page setup i.e. setting margins, changing page size, changing page orientation and applying page background.
d.   Printing a document.
e.   Inserting page numbers, headers and footers, footnote, endnote, date and time, pictures, objects, shapes etc.
f.   Creating bulleted and numbered lists.
g.   Working with tables, paragraphs and columns.
h.   Reviewing (track changes, adding comments etc.) and proof reading a document i.e. spell check, grammar etc.
i.   Creating and working with table of content.
j.   Mail merge.

MS EXCEL
a.   Entering data, formatting data i.e. applying borders, various formats (currency formats, number formats etc.), fonts etc.
b.   Creating custom lists, using auto fill, find and replace and editing text (cut, copy, paste and paste special).
c.   Working with formulae and functions.
d.   Applying conditional formatting to data.
e.   Sorting and filtering data (auto and advanced filter).
f.   Performing Subtotals.
g.   What-if-analysis using goal seek, scenarios and solver.
h.   Pivot tables and data tables (one and two table input)
i.   Working with charts (2D and 3D).
j.   Adding comments, applying password protection to the workbook.
k.   Working with page layout and printing options.

MS POWERPOINT
a)   Creating and formatting slides in a presentation.
b)   Create a master slide with a logo, footer, and font.
c)   Add notes to each slide.
d)   Insert a graphic or picture.

e) Implement a background.
f) Place a text box in the title slide with your name.
g) Insert transitions for each slide.
h) Applying various effects (custom animation and transitional effects) in a presentation.
i) Adjust text alignment in the title slide so it is centered.
j) Printing the slides of a presentation

PC ASSEMBLING AND TROUBLE SHOOTING LAB

L   T   P   Cr   **External Marks: 60**
-   -   4   2   **Internal Marks: 40**

                                                                   Total Marks: 100

PC Hardware

1. Identification of the peripherals of a computer.
2. To prepare a report containing the block diagram of the CPU along with the configuration of each peripheral and its functions.
3. Installation of MS windows and LINUX on a PC.
4. Exposure to Basic commands and system administration in Linux including: Basic Linux commands in bash, Create hard and symbolic links.

Hardware Troubleshooting (Demonstration):
Students will be given a PC which is not bootable due to improper assembly or defective peripherals. Identification of a problem and fixing it for getting to working condition.

Software Troubleshooting (Demonstration): Students have to be given a malfunctioning CPU due to system software problems.

BASIC ACCOUNTING AND FINANCE

L	T	P	Cr	**External Marks: 60**
4	-	-	4	**Internal Marks: 40**

Time Duration: 3 Hrs.   **Total Marks: 100**

NOTE: Ten questions are to be set in all by the examiners by taking three questions from each unit and one compulsory question having 05 short answer type questions from all the units. Students will be required to attempt six questions in all including compulsory Question i.e. question No. 1 and by selecting not more than two questions from each unit.

OBJECTIVES:
The financial aspect of business and management will be taught to student through this subject. This will benefit student in understanding and analyzing financial statements of a business. Student will learn Financial Accounting, Managerial Accounting and Cost Accounting.

UNIT-1

Accounting: Principles, concepts and conventions, double entry system of accounting, introduction to basic books of accounts of sole proprietary concern, closing of books of accounts and preparation of trial balance.
Final Accounts: Trading, Profit and Loss accounts and Balance sheet of sole proprietary concern (without adjustment)

UNIT-2

Financial Management: Meaning, scope and role, a brief study of functional areas of financial management. Introduction to various FM tools: Ration Analysis, Fund Flow statement and cash flow statement (without adjustments).
Costing: nature, importance and basic principles. Marginal costing: Nature scope and importance, Break even analysis, its uses and limitations, construction of break-even chart, Standard costing: Nature, scope and variances (only introduction)

UNIT-3

Computerized accounting: Meaning and advantages, Computer Programs for accounting, Balancing accounts, Trial balance and final accounts in computerized, Accounting, control, and Audit, Sub- Modules of computerized accounting systems

Reference Books
1. I.M.Pandey, Financial Management, Vikas Publications.
2. P.H.Barrett, Computerized Accounting, BPB Publications.
3. Jain and Narang, Cost Accounting.
4. Katyal, Cost Accounting.
5. J.C.Katyal, Principles A Book-Keeping.
6. Jain and Narang, Principles of Accounting.
7. Sharma, Gupta & Bhalla, Management Accounting.

BCA 2nd Semester
COMPUTER ORGANIZATION

L   T   P   Cr   **External Marks: 60**
4   -   -   4   **Internal Marks: 40**

Time Duration: 3 Hrs.   **Total Marks: 100**

NOTE: Ten questions are to be set in all by the examiners by taking three questions from each unit and one compulsory question having 05 short answer type questions from all the units. Students will be required to attempt six questions in all including compulsory Question i.e. question No. 1 and by selecting not more than two questions from each unit.

OBJECTIVES:
- To understand different methods used for the simplification of Boolean functions
- To design and implement combinational circuits
- To design and implement synchronous/ asynchronous sequential circuits

UNIT-1: Introduction to Digital Circuits

Combinational Circuits : Logic Gates and Circuits, , Canonical and Standard Forms, Minimization of Gates, Design of Combinational Circuits, Examples of Logic Combinational Circuits, Adders, Decoders/Encoder, Multiplexer / De-Multiplexer.

Sequential Circuits: Flip Flops, Basic Flip-Flops, Excitation Tables, Master Slave Flip Flops, Edge Triggered Flip-flops, Sequential Circuit Design, Examples of Sequential Circuits, Registers, Counters – Asynchronous Counters, Synchronous Counters, RAM, Design of a Sample Counter.

UNIT-2: Basic Computer Organisation

The Memory System : The Memory Hierarchy, RAM, ROM, Flash Memory, Secondary Memory and Characteristics, Hard Disk Drives, Optical Memories, CCDs, Bubble Memories, RAID and its Levels, The Concepts of High Speed Memories, Cache Memory, Cache Organisation, Memory Interleaving, Associative Memory, Virtual Memory ,Input / Output Devices or External or Peripheral Devices,

The Central Processing Unit: Instruction Set Architecture Instruction Set Characteristics, Instruction Set Design Considerations, Operand Data Types, Types of Instructions, Number of Addresses in an Instruction, Addressing Modes, Stack organisation and Addressing, Instruction Set and Format Design Issues.

Unit -3: Registers and Instruction Execution

Register Organization: Basic CPU Structure, Register Organization, Programmer Visible Registers, Status and Control Registers, General Registers in a Processor.

ALU Organisation: ALU Organisation, A Simple ALU Organization, A Sample ALU Design, Arithmetic Processors.

The Control Unit: The Control Unit, The Hardwired Control, The Micro-Programmed Control, The Micro-Instructions, Types of Micro-Instructions, Control Memory Organisation, Micro-Instruction Formats, The Execution of Micro-Program, RISC and CISC and its characteristics.

Reference Books

1. Modern Digital Electronics- R. P. Jain, Tata McGraw Hill Pub. Company
2. Digital Principles and Applications, A.P. Malvino, McGraw Hill International Editions.
3. Computer System Architecture, M.M. Mano, Third Edition, PHI
4. Computer Organization and Architecture, J.P. Hayes, Third Edition, TMH
5. Computer Organization and Architecture, Stallings, Eighth Edition, PHI

BCA 2nd Semester
COMMUNICATION AND SOFT SKILLS- II

L	T	P	Cr		**External Marks: 60**
4	-	-	4		**Internal Marks: 40**

Time Duration: 3 Hrs.   **Total Marks: 100**

NOTE: Ten questions are to be set in all by the examiners by taking three questions from each unit and one compulsory question having 05 short answer type questions from all the units. Students will be required to attempt six questions in all including compulsory Question i.e. question No. 1 and by selecting not more than two questions from each unit.

Objectives:
- To develop various Communication Skills by using telephone technique, Group Technique, Interviews etc.
- To develop Business Presentation skills.

UNIT-1

The Process of Communication : Introduction of Communication. Types of Communication, Written vs. Oral Communication, Different Types of Face-to-Face Interactions, Characteristics and Conventions of Conversation.
Telephone Techniques, Job Applications and Preparing for Interviews, Preparing for Group Discussions

UNIT-2

Managing Organisational Structure : Warm Up:Ability to Influence and Lead, Reading: The Role of a Manager, Vocabulary: Leadership, Speaking and Listening, Language Focus: Degree of Probability, Grammar: Modals, Writing: Reports, Pronunciation.
Meetings : Reading: A Successful Meeting, Speaking: One to One Meetings, Language Focus: Opening, Middle and Close, Study Skills: Editing, Listening: Criteria for Successful Meetings, Vocabulary, Grammar: Reporting Verbs, Writing: Memos, Taking Notes and Preparing Minutes

UNIT-3

Presentation Skills : Reading: Presentation Skills, Grammar: Verbs often required in Presentations, Language Focus, Listening: Importance of Body Language in Presentations, Speaking: Preparing an Outline of a Presentation, Pronunciation.
Reading: Structure of Presentation, Study Skills: Visual Aids, Ending the Presentation.
Language Focus: Talking about Increase and Decrease, Grammar: Prepositions,
Listening: Podium Panic, Speaking, Pronunciation: Emphasizing the Important Words in Context.
Negotiation Skills : Language Focus: Idiomatic Expressions, Study Skills: Process of Negotiations, Grammar: Phrasal Verbs, Listening: Effective Negotiations, Speaking, Writing.

Reference Books
1. People Skills For Business: Essential Tools to Improve Your Communication Skills and Relationships at Work. Kindle Edition, Melissa Contreras

2. Communication Skills for Engineers and Scientists by Sharma Sangeeta , Mishra Binod , PHI
3. Simon Sweeney, "English for Communication", CUP.

BCA 2nd Semester
Discrete Mathematics

L	**T**	**P**	**Cr**		**External Marks: 60**
4	-	-	4		**Internal Marks: 40**

Time Duration: 3 Hrs.   **Total Marks: 100**

NOTE: Ten questions are to be set in all by the examiners by taking three questions from each unit and one compulsory question having 05 short answer type questions from all the units. Students will be required to attempt six questions in all including compulsory Question i.e. question No. 1 and by selecting not more than two questions from each unit.
OBJECTIVE
To extend student‟s mathematical maturity and ability to deal with abstraction and to introduce most of the basic terminologies used in computer science courses and application of ideas to solve practical problems.

UNIT-1

Relations and Functions: basic definitions of relations and functions, graphics of relations, properties of relations; injective, surjective and bijective functions, composition..

UNIT-2

Recursion and recurrence: The many faces of recursion, recurrence, relations, and some common recurrence relations, generating functions.

UNIT-3

Combinations: Rule of products, permutations, combinations.
Algebra of Logic: Propositions and logic operations, truth tables and propositions generated by set, equivalence and implication laws of logic, mathematical system, and propositions over a universe, mathematical induction.

References

1. Discrete Mathematical Structure with application to Computer Science, Tremblay J.P. and Manohar R, McGraw Hill.
2. Applied Discrete Structure of Computer Science, Doerr A & Kenneth L., Paperback Edition, Galgotia Publications
3. Elements of Discrete Mathematics, C.L Liu, McGraw Hill, New Delhi.
4. Discrete Mathematical Structures, B. Kolman and R.C. Busby, PHI, New Delhi.

BCA 2nd Semester
PROGRAMMING IN C

L   T   P   Cr   External Marks: 60
4   -   -   4   Internal Marks: 40

Time Duration: 3 Hrs.   Total Marks: 100

NOTE: Ten questions are to be set in all by the examiners by taking three questions from each unit and one compulsory question having 05 short answer type questions from all the units. Students will be required to attempt six questions in all including compulsory Question i.e. question No. 1 and by selecting not more than two questions from each unit.

OBJECTIVES
- To Know the Basics of programming
- To understand how to use programming in day to day Applications.

UNIT-1

Introduction to „C" Language & Fundamentals: Character set, C Tokens, Keywords, Identifiers, Variables, Constant, Data Types, and Comments.
Build in Operators and function: Console based I/O and related built in I/O function: printf(), scanf(), getch(), getchar(), putchar(); Concept of header files.
Operators: Types of operators, Precedence and Associativity, Expression, Statement and types of statements
Control structures: Decision making structures: If, If-else, Nested If-else, Switch.

UNIT-2

Loop Control structures: While, Do- while, for, Nested for loop; other statements: break, continue, goto, exit.
Functions: Introduction to Functions, Function Declaration, Function Categories, Standard Functions, Parameters and Parameter Passing
Call by value, Call by reference, Recursion, Global and Local Variables, Storage classes.

UNIT-3

Arrays: One Dimensional Arrays, Two Dimensional Arrays, Operations with Arrays, structures, union, string.
Pointers: Declaration, operations on pointers, array   of pointers, pointers to arrays.
Structure & Union, File Handling.

Reference Books
1. Introduction to Computers, Peter Norton– Tata MGHill
2. Structured programming approach using C, Forouzah & Ceilber, Thomson learning Publication.
3. Let us C-Yashwant Kanetkar, BPB Publications

COMPUTER ORGANIZATION LAB

L   T   P   Cr   **External Marks: 60**
-   -   4   2   **Internal Marks: 40**
                                                                               Total Marks: 100

List if Experiments (Not limiting to)

1. Study of Logic Gates: Truth-table verification of OR, AND, NOT, XOR, NAND and NOR gates; Realization of OR, AND, NOT and XOR functions using universal gates.
2. Half Adder / Full Adder: Realization using basic and XOR gates.
3. Half Subtractor / Full Subtractor: Realization using NAND gates.
4. 4-Bit Binary-to-Gray & Gray-to-Binary Code Converter: Realization using XOR gates.
5. 4-Bit and 8-Bit Comparator: Implementation using IC7485 magnitude comparator chips
6. Multiplexer: Truth-table verification and realization of Half adder and Full adder using IC74153 chip.
7. Demultiplexer: Truth-table verification and realization of Half subtractor and Full subtractor using IC74139 chip.
8. Flip Flops: Truth-table verification of JK Master Slave FF, T-type and D-type FF using IC7476 chip.
9. Asynchronous Counter: Realization of 4-bit up counter and Mod-N counter using IC7490 & IC7493 chip.
10. Synchronous Counter: Realization of 4-bit up/down counter and Mod-N counter using IC74192 & IC74193 chip.
11. Shift Register: Study of shift right, SIPO, SISO, PIPO, PISO & Shift left operations using IC7495 chip.

Implementation all experiments with be with the help of Bread- Board.

L   T   P   Cr   **External Marks: 60**
-        -   4   2   **Internal Marks: 40**

Total Marks: 100

List if Experiments (Not limiting to)

[1]   Write a program sum of two numbers
[2]   Write a program to check either the number is even or odd
[3]   Write a program calculate simple interest.
[4]   Write a program to calculate the marks of four subject and percentage.
[5]   Write a program to check either the year is leap year or not.
[6]   Write a program to find out the grade using if/else if statement.
[7]   Write a program to find out the greater number between two number.
[8]   WAP to read base and height of a triangle, calculate the area using formula :
                Area =1/2*base*height
[9]   WAP to read marks obtained and maximum marks of a student and calculate its
            percentage and display it.
[10]   Write a program to print even number up to n.
[11]   Write a program to print odd number up to n.
[12]   Write a program to print table.
[13]   Write a program using while to print the sum of any numbers.
[14]   Write a program to find the sum of first 100 +ve integers.
[15]   Write a program to find the sum of even or odd number from 100+ve integers.
[16]   Write a program to find whether the given number is prime or not.
[17]   Write a program to print first N prime numbers.
[18]   Write a program to check whether the given number is an Armstrong number.
[19]   Write a program whether the character is a vowel or not by using switch statement
[20]   WAP to divide a number with 2 using bitwise operator
[21]   WAP to read a number between 1 to 7 and print day of the week using switch statement.
[22]   WAP to read marks of a student in three subjects and calculate its percentage and
            division acc to conditions:
                Per>=60 implies division=First
                50<=per<60 implies division=Second
                40<=per<50 implies division=Third
                Per<40 implies result =fail
[23]   WAP to generate a series of prime numbers between 2 to n.

[24]   WAP to print

```
          1
         22
        333
       4444
      55555
       4444
        333
         22
          1
```

[25]   WAP to find roots of a quadratic equation.
[26]   WAP to find sum of Fibonacci series upto n.
[27]   WAP to reverse the elements of an array.
[28]   WAP to add two matrices
[29]   WAP to multiply two matrices.
[30]   WAP to enter a string and check if it is palindrome or not.
[31]   WAP to find a substring in a given string S.

**Note: Each program should be fully documented with Input Output data and Flow
        charts need to be developed.**

COLLOQUIUM

L   T   P   Cr
-   -   2   1

External Marks: 60
Internal Marks: 40

Time Duration: 3 Hrs.

Total Marks: 100

NOTE: Is related to seminar, extempore which is in curriculum

BCA 3rd Semester

Data Structure using C

L	T	P	Cr		External Marks: 60
4	-	-	4		Internal Marks: 40

Time Duration: 3 Hrs.   **Total Marks: 100**

NOTE: Ten questions are to be set in all by the examiners by taking three questions from each unit and one compulsory question having 05 short answer type questions from all the units. Students will be required to attempt six questions in all including compulsory Question i.e. question No. 1 and by selecting not more than two questions from each unit.

Objectives:
- To learn the systematic way of solving problem.
- To understand the different methods of organizing large amounts of data.
- To efficiently implement the different data structures.
- To efficiently implement solutions for specific problems.

UNIT-1

An introduction to various types of data structures, various operations associated with each data structure, Implementation of Data Structures. Basic concepts and notations, mathematical notation and functions, algorithmic complexity and time space trade off. Arrays: Types of arrays, Operations on Arrays Creation, Insertion, Deletion,

UNIT-2

Recursion: Introduction, Direct and Indirect Recursion, Tail Recursion, Efficiency of Recursion. Link List: Representation of linked list, Link list operations, Circular Linked List, Multi linked structures, Memory Representation: Fixed Block Storage and Variable Block Storage, Applications of Linked List
Stack: Memory Representation of Stacks via arrays and Linked List, Operations on Stack: Push, pop, Application of stack: Infix to postfix and prefix forms for expressions, Evaluation of postfix expressions, Tower of Hanoi Problem, Code Generation for Stack Machines.

UNIT-3

Queue: Representation using array and linked List, Operations on Queue, Insertion, deletion, Types of queues, Applications: Simulation etc.
Trees: Definitions and basic concepts, linked tree representation, representations in contiguous storage, binary trees and its types, Physical Implementation of Binary Tree in Graph:Representation of Graphs, Traversals in Graphs, Applications of Graphs – Shortest Path Problem, Minimum Spanning Trees

References:
1. Seymour Lischutz, Data Structures, McGraw-Hill Book Company, Schaum's Outline Series, New York.
2. Trembley, J.P. and Sorenson P.G. An Introduction to Data Structures with Applications, McGraw-Hill International Student Edition, New York.
3. Yedidyah Langsam, Moshe J Augernstein and Aarson M.Tanenbaum, Data Structures using C and C ++, PHI, New Delhi.

BCA 3rd Semester
Database Management Systems

L	T	P	Cr		
				External Marks: 60	
4	-	-	4	**Internal Marks: 40**	

Time Duration: 3 Hrs.   **Total Marks: 100**

NOTE: Ten questions are to be set in all by the examiners by taking three questions from each unit and one compulsory question having 05 short answer type questions from all the units. Students will be required to attempt six questions in all including compulsory Question i.e. question No. 1 and by selecting not more than two questions from each unit.

Objectives
- To learn the fundamentals of data models and to conceptualize and depict a database system using ER diagram
- To make a study of SQL and relational database
- To know the fundamental concepts of transaction processing- concurrency control techniques and recovery procedure.

UNIT-1

Introduction: Overview of Database Management System: Various views of data Models, Schemes and Introduction to database Languages & Environments, Advantages of DBMS over file processing systems, Responsibility of Database Administrator. Three level architecture of Database Systems: Introduction to client/Server architecture. Data Models: E-R Diagram (Entity Relationship), mapping Constraints, keys, Reduction of E-R diagram into tables.

UNIT- 2

Network & Hierarchical Models, File Organization: Sequential File, index sequential files, direct files, Hashing, B-trees Index files, Inverted Lists., Relational Models, Relational Algebra & various operations (set operations, select, project, join, division), Order, Relational calculus: Domain, Tuple, Well Formed Formula, specification, quantifiers, Introduction to Query Language, QBE

UNIT-3

Integrity constrains, functional dependencies & Normalization, 1st, 2nd, 3rd and BCNF. Introduction to Distributed Data processing, Concurrency control: Transactions, Time stamping, Lock-based Protocols, Serializability and Recovery Techniques.

Reference Books:
1. Fundamentals of Database Systems by R.Elmasri and S.B.Navathe, 3rd Edition, Pearson Education, New Delhi.
2. An Introduction to Database Systems by C.J. Date, 7th Edition, Pearson Education, New Delhi.
3. A Guide to the SQL Standard, Data, C. and Darwen, H.3rd Edition, Reading, Addison-Wesley Publications, New Delhi.
4. Introduction to Database Management system by Bipin Desai, Galgotia Pub, New Delhi.

5. Database System Concepts by A. Silberschatz, H.F.Korth and S.Sudarshan, 3rd Edition, McGraw-Hill, International Edition.
6. SQL / PL/SQL, by Ivan Bayross, BPB Publications.

BCA 3rd Semester
Programming in C++

L T P Cr   **External Marks: 60**
4 - - 4   **Internal Marks: 40**

Time Duration: 3 Hrs.   **Total Marks: 100**

NOTE: Ten questions are to be set in all by the examiners by taking three questions from each unit and one compulsory question having 05 short answer type questions from all the units. Students will be required to attempt six questions in all including compulsory Question i.e. question No. 1 and by selecting not more than two questions from each unit.

Objectives:
- To Know the Basics Of Programming
- To Understand how to use programming in day to day Applications.

UNIT-1

Introduction: Object oriented programming, characteristics of object orientated languages, classes, C++ basics: Program Statements, Variables and constants, Loops and Decisions.

UNIT-2

Functions: Defining a function, function arguments & passing by value, arrays & pointers, function & strings, functions & structures.
Classes & Objects: Defining class, class constructors and destructors, operator overloading.

UNIT-3

Class Inheritance: Derived class & base class; Virtual, Friends and Static functions; Multiple inheritance, Polymorphism.
Input/output files: Streams, buffers & iostreams, header files, redirection, file input and output

Reference books:
- Object Oriented Programming with C++ by E Balagurusamy, 2001, Tata McGraw- Hill, New Delhi.
- Object Oriented Programming in Turbo C+ + by Robert Lafore, Pearson Education, New Delhi.
- The Complete Reference in C++ by Herbert Schildt, 2002, TMH, New Delhi.
- Object Oriented Programming Using C++ by Kamthane, Pearson Education, New Delhi.
- C + + How to Program by H M Deitel and P J Deitel, 1998, Prentice Hall, India, New Delhi.

SYSTEM ANALYSIS AND DESIGN

L	**T**	**P**	**Cr**	**External Marks: 60**
4	**-**	**-**	**4**	**Internal Marks: 40**

Time Duration: 3 Hrs.   **Total Marks: 100**

NOTE: Ten questions are to be set in all by the examiners by taking three questions from each unit and one compulsory question having 05 short answer type questions from all the units. Students will be required to attempt six questions in all including compulsory Question i.e. question No. 1 and by selecting not more than two questions from each unit.

Objectives:
The objective of this course is to teach the student about the area of systems analysis and design and to develop abilities in this area. At the completion of this course, the following objectives should have been accomplished:
The student will have prepared a portfolio of their work that can be used in job searches.

- The student should understand how an analyst does a preliminary and detailed analysis
- The student should understand how an analyst does a systems design The decision should be able to make and use decision tables and other logical tools

UNIT-1

System Concepts: Definition, characteristics, elements & types of system.
System development life cycle: Recognition of need: Feasibility study, system analysis-introduction, information collection, interviews, questionnaires, observation, record searching and document analysis

UNIT-2

Analysis tools, data flow diagram, data dictionary, decision tree, structured English and decision table.
System Design: The process and stages of systems design, input/output and file design

UNIT-3

System Implementation: System implementation, system testing:Black box,White Box, Alpha, Beta Testing, Unit Testing and System Testing, implementation process and implementation methods: Parallel Run, Phased Adoption; system maintenance: Corrective maintenance, Adaptive maintenance and Perfective maintenance.

Reference Books

- Awad Elias N., System analysis and design (Galgotia)
- Sen James A., Analysis and design of information system (Tata McGraw)
- Burd, Stephen. D System architeure (PHI)
- Shelly Garry, B Rosan Belt System analysis and Design-9th(Tata McGraw)

Programming in C++ Lab

L	T	P	Cr		External Marks: 60
-	-	4	2		Internal Marks: 40

Time Duration: 3 Hrs.   **Total Marks: 100**

- Write a program to display "Hello World" in „C++" language
- Implementation of input and output statements
- Implementation of control statements.
- Implementation of functions.
- Implementation of single dimension, two dimension and three dimension array
- Write a C++ program that uses a recursive function for solving Towers of Hanoi problem.
- Write a C++ program to implement the matrix ADT using a class. The operations supported by this ADT are:
  a) Reading a matrix.
  b) Addition of matrices.
  c) Printing a matrix.
  d) Subtraction of matrices.
  e) Multiplication of matrices.

- Write a C++ program that overloads the + operator and relational operators (suitable)to perform the following operations:
  a) Concatenation of two strings.
  b) Comparison of two strings.

- Write C++ programs that illustrate how the following forms of inheritance are supported:
  a) Single inheritance
  b) Multiple inheritance
  c) Multi inheritance
  d) Hierarchical inheritance
- Write a C++ program that illustrates the order of execution of constructors and destructors when new class is derived from more than one base class.
- Write a C++ program that illustrates how run time polymorphism is achieved using virtual functions.
- Write a C++ program that illustrates the role of virtual base class in building class hierarchy.

- Write a C++ program that illustrates the role of abstract class in building class hierarchy.

➢ Write a C++ program that uses functions:
a)To create a singly linked list of elements
b)To display the elements of the above list.
Note: Use the following in solving the above problems wherever they make sense:
a) Constructors and destructors.
b) Overloaded functions.
c) Overloaded operator.
d) Function and class templates. e) Exception handling mechanism.

➢ Write a C++ program to display the contents of a text file.

➢ Write a C++ program which copies one file to another.

➢ Write a C++ program to that counts the characters, lines and words in the text file.

➢ Write a C++ program to change a specific character in a file. Note: Filename , number of the byte in the file to be changed and the new character are specified on the command line.

➢ Write a C++ program to reverse the first n characters in a file.

BCA 3rd Semester
Data Structure using C Lab

L	T	P	Cr		External Marks: 60
-	-	4	2		Internal Marks: 40
					Total Marks: 100

List of the Programs not limiting to:

1) Revision of programs of Data Structures from pervious semester: Insertion Sort, Bubble Sort, Selection Sort, Linear Search, Binary Search
2) Write a Program to Implement a Linked List
3) Write a Program to Implement a Doubly Linked List
4) Write a Program to Implement a Stack Dynamically
5) Write a Program to Implement a Queue dynamically
6) Write a Program to Implement a Circular Linked List
7) Write a Program to Implement Binary Search Tree
8) Write a Program to Implement Inorder
9) Write a Program to implement Postorder
10) Write a Program to implement Pretorder
11) Write a Program to implement Heapsort
12) Write a program to implement Breadth First search
13) Write a program to implement Depth First search
14) Write a Program to implement Dijkstra‟s Algorithm
15) Write a Program to Implement Bubble Sort using Recursion
16) Write a Program to Implement Insertion Sort using Recursion
17) Write a Program to Implement Selection Sort using Recursion
18) Write a Program to Implement Linear Search using Recursion
19) Write a Program to Implement Linear Search using Recursion

BCA 3rd Semester
Database Management Systems Lab

L   T   P   Cr   **External Marks: 60**
-   -   4   2   **Internal Marks: 40**

                                                         Total Marks: 100

List of the Programs not limiting to:

➢
Creating Database
  ➢ Creating a Database
  ➢ Creating a Table
  ➢ Specifying Relational Data Types
  ➢ Specifying Constraints
  ➢ Creating Indexes
➢ **Table and Record Handling**
  ➢ INSERT statement
  ➢ Using SELECT and INSERT together
  ➢ DELETE, UPDATE, TRUNCATE statements
  ➢ DROP, ALTER statements
➢ **Retrieving Data from a Database**
  ➢ The SELECT statement
  ➢ Using the WHERE clause
  ➢ Using Logical Operators in the WHERE clause
➢ Using IN, BETWEEN, LIKE , ORDER BY, GROUP BY and HAVING
➢ **Clause**
  ➢ Using Aggregate Functions
  ➢ Combining Tables Using JOINS
  ➢ sub- queries
➢ **Database Management**
  ➢ Creating Views
  ➢ Creating Column Aliases
  ➢ Creating Database Users
  ➢ Using GRANT and REVOKE

BCA3rd Semester
COLLOQUIUM

L   T   P   Cr   **External Marks: 60**
-   -   2   1   **Internal Marks: 40**

Time Duration: 3 Hrs.   **Total Marks: 100**

NOTE: Is related to seminar, extempore which is in curriculum

BCA 4th Semester
Fundamentals of Computer Network

L   T   P   Cr   **External Marks: 60**
4   -   -   4   **Internal Marks: 40**

Time Duration: 3 Hrs.   **Total Marks: 100**

NOTE: Ten questions are to be set in all by the examiners by taking three questions from each unit and one compulsory question having 05 short answer type questions from all the units. Students will be required to attempt six questions in all including compulsory Question i.e. question No. 1 and by selecting not more than two questions from each unit.

Objectives
- To Know the Basics Structure Networks
- To Understand various phases Data Transfer.

UNIT-1

Data communications concepts: Digital and analog parallel and serial synchronous and asynchronous, simplex, half duplex, full duplex, multiplexing.
Communication channels: Wired transmissions: Telephone lines, leased lines, switch line, coaxial cables-base band, broadband, optical fiber transmission.

UNIT-2

Wireless transmission: Microwave transmission, infrared transmission, laser transmission, radio transmission, and satellite transmission. Communication switching techniques; Circuit switching, message switching, packet switching
Network reference models: Network topologies, OSI references model, TCP/IP reference model, comparison of OSI and TCI reference model.

UNIT-3

Data link layer design issue: Services provided to the network layer, framing, error control, flow control HDLC, SDLC, data link layer in the internet (SLIP, PPP).
The Network Layer: Design Issues, Routing Algorithms: Optimality principled, shortest path routing, Concept of Internet Working.

References
- Data Communication & Networking, Frozen Tata McGraw Hill Publications, New Delhi.
- Computer Networks, Tannan Baun, Andrew (PHI)
- Data & Computer Communications, Stallings PHI, New Delhi.

Operating System

L	T	P	Cr		External Marks: 60
4	-	-	4		Internal Marks: 40

Time Duration: 3 Hrs.   **Total Marks: 100**

NOTE: Ten questions are to be set in all by the examiners by taking three questions from each unit and one compulsory question having 05 short answer type questions from all the units. Students will be required to attempt six questions in all including compulsory Question i.e. question No. 1 and by selecting not more than two questions from each unit.

OBJECTIVES:
To understand the basic concepts and use of Operating system and it"s working with architecture.

UNIT- 1

Introduction to operating system, its need and operating system services; operating system classification – single user, multi user, simple batch processing, Multiprogramming, Multitasking, parallel Systems, Distributed system, Real time system
Process Management: Process concept, Process scheduling, threads, overview of Inter process communication, CPU scheduling: Basic concepts, Scheduling Criteria, Scheduling algorithms.

UNIT- 2

Memory management: Logical versus Physical address space, Swapping, Partition, Paging and segmentation.
Virtual memory: Demand paging, Page replacement algorithms, Allocation algorithms, Thrashing.
File Management: File concept, access methods, and Directory structure – single level, two lever, tree structures, acrylic graph and general graph directory, file protection. Allocation methods: Contiguous, linked and index allocation, free space management.

UNIT- 3

Device management: Disk structure, disk scheduling, FCFS scheduling, SSTF scheduling, SCAN scheduling, C-SCAN scheduling, Selecting Disk Scheduling Algorithms
Deadlock: Deadlock characteristics, Prevention, Avoidance, Detection and Recovery, critical section, synchronization hardware, semaphores, combined approach to deadlock handling

Reference Books
- Operating System Concepts by Peterson, J.L. & Silberschatz, A. Addison Wesley, New Delhi.
- Operating System Principles by Brinch, Hansen, PHI, New Delhi.
- Operating System by Tanenbaum, A.S., PHI, New Delhi.
- Operating System by Stalling Willams, PHI, Delhi.

PROGRAMMING IN JAVA

L	T	P	Cr		External Marks: 60
4	-	-	4		Internal Marks: 40

Time Duration: 3 Hrs.   **Total Marks: 100**

NOTE: Ten questions are to be set in all by the examiners by taking three questions from each unit and one compulsory question having 05 short answer type questions from all the units. Students will be required to attempt six questions in all including compulsory Question i.e. question No. 1 and by selecting not more than two questions from each unit.

Objectives:
- Object oriented technology is successfully incorporated in various fields of computer science. Since its arrival on the scene, Java has been accepted as one of the primary programming language.
- This course is designed to give you exposure to basic concepts of object-oriented technology. This course will help in learning to write programs in Java using object-oriented paradigm.

UNIT-1

Object Oriented Methodology : Classes and Objects, Abstraction and Encapsulation, Inheritance, Method Overriding and Polymorphism.
Java Language Basics : Introduction To Java, Basic Features, Java Virtual Machine Concepts, A Simple Java Program, Primitive Data Type And Variables, Java Keywords, Integer and Floating Point Data Type, Character and Boolean Types, Declaring and Initialization Variables, Java Operators.
Expressions, Statements and Arrays
Expressions, Statements, Control Statements, Selection Statements, Iterative Statements, Jump Statements, Arrays.

UNIT-2

Class and Objects : Class Fundamentals, Creating objects, Assigning object reference variables, Introducing Methods, Static methods, Constructors, Overloading constructors, This Keyword, Using Objects as Parameters, Argument passing, Returning objects, Method Overloading, Garbage Collection, The Finalize ( ) Method.
Inheritance and Polymorphism, Packages and Interfaces, Exceptions Handling, Multithreading, I/O and String Handling , I/O in Java

UNIT-3

Applets , Graphics and User Interfaces ,Socket Overview, Reserved Parts and Proxy Servers, Internet Addressing: Domain Naming Services (DNS), JAVA and the net: URL, TCP/IP Sockets, Datagrams.
Advance Java : Java Database Connectivity, Establishing A Connection, Transactions with Database, An Overview of RMIApplications, Remote Classes and Interfaces, RMIArchitecture, RMI Object Hierarchy, Security.

Reference Books

- JAVA: The Ultimate Beginner's Guide! by Andrew Johansen
- Patrick Naughton and Herbertz Schildt, "Java-2 The Complete Reference" 199, TMH.
- Shelley Powers, "Dynamic Web Publishing" 2nd Ed. Techmedia, 1998.
- Ivor Horton, "Beginning Java-2" SPD Publication
- Jason Hunter, "Java Servlet Programming" O"Reilly
- Shelley Powers, "Dynamic Web Publishing" 2nd Ed. Techmedia, 1998 rd
- Hans Bergsten, "Java Server Pages", 3 Ed. O"reilly.

INTRODUCTION TO ALGORITHM DESIGN

L	T	P	Cr		External Marks: 60
4	-	-	4		Internal Marks: 40

Time Duration: 3 Hrs.   **Total Marks: 100**

NOTE: Ten questions are to be set in all by the examiners by taking three questions from each unit and one compulsory question having 05 short answer type questions from all the units. Students will be required to attempt six questions in all including compulsory Question i.e. question No. 1 and by selecting not more than two questions from each unit.

Objectives:
To learn about properties of algorithm and how to design an algorithm, discuss asymptotic notations, Design and measure time complexity analysis of searching, sorting and Graph traversal algorithms. Make comparison of different type of algorithm likes Linear, Quadratic, Polynomial and Exponential, Describe how greedy approach facilitate solving the problem. Discuss Divide and Conquer approach for solving the problem.

UNIT-1

Basics of an Algorithm : Definition and Example of an algorithm, Characteristics of an algorithm, Steps in Designing ofAlgorithms, Growth of function, Recurrence, Problem Formulation (Tower of Hanoi), Substitution Method, Iteration Method, Master Method.
Asymptotic Bounds : Asymptotic Notations, Concept of efficiency of analysis of an algorithm Comparative efficiencies of algorithms: Linear, Quadratic, Polynomial and Exponential.

UNIT-2

Searching and Sorting : Euclid"s algorithm for GCD, Horner"s Rule for polynomial evaluation, Simple Matrix (n x n) Multiplication, Exponent evaluation e.g. a_n, Searching, Linear Search, Sorting, Bubble sort, Insertion Sort, Selection sort.
Greedy Technique : Elements of Greedy strategy, Activity Selection Problem, Continuous Knapsack Problem, Coin changing Problem, More Examples.

UNIT-3

Divide and Conquer Approach : General Issues in Divide and Conquer, Binary Search, Merge Sort, Quick Sort, Integer Multiplication, More Examples.
Graph Algorithm : Representation of Graphs, Adjacency Matrix, Adjacency List, Depth First Search and Examples, Breadth First Search and Examples.

Reference Books
- Introduction to the Design and Analysis of Algorithms (2nd Edition) by Anany Levitin.
- Fundamentals of Computer Algorithms. 2nd Edition, E. Horowitz, S. Sahni, and S.Rajsekran, University Press, Hyderabad.
- Introduction of Computer Algorithm, T. H Cormen, Leiserson, Rivest and Stein, PHI, New Delhi.

JAVA Lab

L	**T**	**P**	**Cr**		**External Marks: 60**
-	**-**	**4**	**2**		**Internal Marks: 40**

Time Duration: 3 Hrs.   **Total Marks: 100**

1. Programs using constructor and destructor.
2. Creation of classes and use of different types of functions.
3. Count the number of objects created for a class using static member function.
4. Write programs on interfaces.
5. Write programs on packages.
6. Write programs using function overloading.
7. Programs using inheritance.
8. Programs using IO streams.
9. Programs using files.
10. Write a program using exception handling mechanism.
11. Programs using AWT
12. Programs on swing.
13. Programs using JDBC

Operating System Lab

L   T   P   Cr   **External Marks: 60**

-   -   4   2   **Internal Marks: 40**

Time Duration: 3 Hrs.   **Total Marks: 100**

List of the Programs not limiting to:

- Install Linux on the system dual boot with the windows operating System.
- Create, remove, and resize various types of partitions through GUI
- Create and remove various types of partitions through command line.
- Resize various types of partitions through command line.
- Internal Command like creating the files, directories, help, date, append
- External commands like at, batch, cron, tab.
- Filters on the contents of a file using grep, egrep, fgrep.
- Creating, Removing of Swap space as well as swap file.
- Managing Users and Groups in Linux
- Program to Add and Modify the Password.
- Shell script to find the factorial value of any number entered through the keyboard.
- Script to create a DMC of a student.
- To study various file-directories handling commands.
- To study the various shell commands in Linux.
- Write a script to Implement Menu driven calculator.
- Implement Mount, Unmount and Make file systems.

COLLOQUIUM

L	T	P	Cr		External Marks: 60
-	-	2	1		Internal Marks: 40

Time Duration: 3 Hrs.   **Total Marks: 100**

NOTE: Is related to seminar, extempore which is in curriculum

SEMINAR

L   **T**   **P**   **Cr**   **External Marks: 60**

-   **-**   **2**   **2**   **Internal Marks: 40**

Time Duration: 3 Hrs.   **Total Marks: 100**

Industry Seminar Industry seminars are suggested to enable the students of BCA to appreciate the software development which are going on in industries in India. These seminars will help the students to face interviews with some confidence. The students should attend these and submit a report. The following points are listed to enable the college to organize these seminars.

PROBABILITY & STATISTICS

L	T	P	Cr		**External Marks: 60**
4	-	-	4		**Internal Marks: 40**

Time Duration: 3 Hrs.   **Total Marks: 100**

NOTE: Ten questions are to be set in all by the examiners by taking three questions from each unit and one compulsory question having 05 short answer type questions from all the units. Students will be required to attempt six questions in all including compulsory Question i.e. question No. 1 and by selecting not more than two questions from each unit.

OBJECTIVE
To extend student‟s mathematical maturity and ability to deal with abstraction and to introduce most of the basic terminologies used in computer science courses and application of ideas to solve practical problems.

UNIT-1

Statistics: Introduction, Data Collection, Techniques of Data Collection, Data Analysis: Measure of Central Tendency, Frequency distribution, Mean, Median, Mode, Mean Deviation, Measures of Dispersion: Range Quartile Deviation, Mean Deviation, and Standard Deviation Standard Deviation.

UNIT-2

Correlation &Regression: Meaning, Significance, Causes and Effect Relationship. of Types of Correlation. Meaning, Uses Regression Analysis, Relationship between Correlation and Regression analysis

UNIT-3

Probability: Multiplication theorem on Probability. Conditional probability, independent events, total probability, Random variable and its probability distribution, mean and variance of haphazard variable. Repeated independent (Bernoulli) trials and Binomial distribution.

Reference Books
1. Fundamental of Mathematical Statistics, S.C. Gupta, V.K. Kapoor, Sultan Chand and Company.
2. Introduction to Probability & Statistics, Seymour Lipschutz, Jack Schiller, Jack Schiller S, McGraw-Hill Publishers.
3. Probability & Statistics for Engg, Dr. J. Ravichandran ,Willey Publications
4. Probability And Statistics, Dr. B. Krishna Gandhi, Dr. T.K.V Iyengar, M.V.S.S.N. Prasad, S. Chand Publishing Co.

SOFTWARE ENGINEERING

L	T	P	Cr		**External Marks: 60**
4	-	-	4		**Internal Marks: 40**

Time Duration: 3 Hrs.   **Total Marks: 100**

NOTE: Ten questions are to be set in all by the examiners by taking three questions from each unit and one compulsory question having 05 short answer type questions from all the units. Students will be required to attempt six questions in all including compulsory Question i.e. question No. 1 and by selecting not more than two questions from each unit.

Objectives
- To Know the Basics of Software Architecture
- To Understand various phases of Software Development Cycle

UNIT-1

Software: Characteristics, Components, Applications, And Software Process Models: Waterfall, Spiral, Prototyping, Fourth Generation Techniques, Concepts of Project Management, Role of Metrics & Measurements.

UNIT-2

S/W Project Planning: Objectives, Decomposition techniques: S/W Sizing, Problem-based estimation, Process based estimation, Cost Estimation Models: COCOMO Model, The S/W Equation, System Analysis: Principles of Structured Analysis, Requirement analysis, DFD, Entity Relationship diagram,
Data dictionary.

UNIT-3

S/W Design: Objectives, Principles, Concepts, Design methodologies: Data design, Architectural design, procedural design, Object -oriented concepts
Testing fundamentals: Objectives, principles, Testability, Test cases: White box & Black box testing, Testing strategies: verification & validation, unit test, integration testing, validation testing, system testing**.**

References
1. Software Engineering - A Practitioner‟s Approach, Roger S. Pressman, MGH, NEW DELHI., NEW DELHI. Publications, New Delhi.
2. Fundamentals of Software Engineering, Rajib Mall, PHI, New Delhi.
3. An Integrated Approach to Software Engineering by Pankaj Jalote, Narosa Publications, New Delhi.
4. Software Engineering by Ian Summerville, Pearson Education, 5th Edition, New Delhi.

BCA 5th Semester
MICROPROCESSORS AND INTERFACING

L   T   P   Cr   **External Marks: 60**
4   -   -   4   **Internal Marks: 40**

Time Duration: 3 Hrs.   **Total Marks: 100**

NOTE: Ten questions are to be set in all by the examiners by taking three questions from each unit and one compulsory question having 05 short answer type questions from all the units. Students will be required to attempt six questions in all including compulsory Question i.e. question No. 1 and by selecting not more than two questions from each unit.

Objectives
- The Microprocessor is a general –purpose programmable logic device. A thorough understanding of the microprocessor demands concepts and skills from two different disciplines: hardware concepts from electronics and programming skills from computer science.
- Microprocessor is an exciting, challenging and growing field. It will pervade industry for decades to come.

UNIT-1

Introduction to Micro Computers, Microprocessors and Assembly Languages - Microprocessor architecture and its operations - 8085 MPU - 8085 Instruction set and classifications.
Writing assembly levels programs - Programming techniques such as looping, counting and indexing addressing nodes - Data transfer instructions - Arithmetic and logic operations - Dynamic debugging.

UNIT - 2

Counters and Time delays - Hexadecimal counter - Modulol 0 counter - Pulse Timings for flashing lights - Debugging counter and time delay program - stack - subroutine - conditional call and return instructions.
BCD to Binary and Binary to BCD conversions - BCD to HEX and HEX to BCD conversions - AS CII to BCD and BCD to ASCII conversions - BCD to Seven segment LED Code conversions - Binary to ASCII and ASCII to Binary conversions - Multibyte Addition - Multibyte subtraction - BCD addition - BCD Subtraction - Multiplication and Division.

UNIT - 3

Interrupt - Implementing interrupts - Multiple interrupt - 8085 - trap - Problems on implementing 8085 interrupt - DMA - Memory interfaces - Ram & Rom - I/O interface - Direct I/O - Memory mapped I/O.
References:

1. R. S. Gaonkar, 'Microprocessor Architecture, Programming and Applications with 8085/8080A', Wiley East em limited, 1990.
2. A. Mathur, 'Introduction to Microprocessor', Third Edition, Tata McGraw-Hill Publishing Co. Ltd., 1993.

3. Fundamentals of Microprocessors and Microcomputers – B.RAM, Dhanpat Rai Pub.
4. The Intel Microprocessors8086/8080, 186/286, 386, 486, Pentium and Pentium Pro processor Architecture, Programming and Interfacing – Barry R. Brey, PHI.

BCA 5th Semester
WEB PROGRAMMING

L	T	P	Cr	External Marks: 60
4	-	-	4	Internal Marks: 40

Time Duration: 3 Hrs.   **Total Marks: 100**

NOTE: Ten questions are to be set in all by the examiners by taking three questions from each unit and one compulsory question having 05 short answer type questions from all the units. Students will be required to attempt six questions in all including compulsory Question i.e. question No. 1 and by selecting not more than two questions from each unit.

Objectives:
After going through this course a student should be able to: Use XHTML tags to create simple static web pages; format a simple Web page using Cascading Style sheets; state the concepts applicable to web programming; create an interactive and dynamic Web site using JavaScript; represent data over the Web using XML; appreciate the use of Ajax and Rich Internet Applications, and perform server side scripting using Java Server Pages (JSP).

UNIT – I HTML & CSS

HTML :- Basics of HTML, formatting and fonts, hyperlink, tables, images, forms, XHTML, Meta tags, Browser architecture and Web site structure. Overview and features of HTML5.
Style Sheets: Introduction to CSS, Need for CSS, basic syntax and structure using CSS, background images, colors and properties, manipulating texts, using fonts, borders and boxes, margins, padding lists, positioning using CSS.

UNIT - II

Java Script:-
Introduction, Client-Side JavaScript, Server-Side JavaScript, JavaScript Objects, JavaScript Security, Operators, Statements, Document and its associated objects, Events and Event Handlers, Core JavaScript (Properties and Methods of Each)

UNIT – III

PHP (Hypertext Preprocessor): Introduction, syntax, variables, strings, operators, if-else, loop, switch, array, function, form, mail, file upload, session, error, exception, filter, PHP-ODBC.
MYSQL: Introduction to Database and MYSQL, RDBMS-Understanding Tables, Records & Fields, SQL language, MYSQL queries.
Working with MYSQL Admin: Working with PHP My admin, data types, creating Database and tables, dropping Database and tables, adding fields, selecting table, Altering fields properties.

Books Recommended (1 Text Book + 2 Reference Books)
1. Ullman, "PHP for the Web: Visual QuickStart Guide", Pearson Education

2. PHPMYSQL F undamental learning Book, Kent Elchuk

3. Beginning HTML5 with CSS3, Apress publisher
4. Charlie Collins, Michael Galpin and Matthias Kappler, "Android in Practice", DreamTech

ERP AND E-COMMERCE

L   T   P   Cr   **External Marks: 60**
4   -   -   4   **Internal Marks: 40**

Time Duration: 3 Hrs.   **Total Marks: 100**

NOTE: Ten questions are to be set in all by the examiners by taking three questions from each unit and one compulsory question having 05 short answer type questions from all the units. Students will be required to attempt six questions in all including compulsory Question i.e. question No. 1 and by selecting not more than two questions from each unit.

Objectives:
The Objectives of the Course are:
- To make the student aware about the basics of E-commerce, its processes and some of the services/products supporting these processes.
- After studying this course, the students shall be able to understand the basic related business processes like B2B, C2B & B2C involved in the area of E-Commerce with an overview of the technical support for the processes.

UNIT-1
Introduction to E-Commerce : Introduction of E-Commerce and M-Commerce, E-Commerce trade cycle, Electronic Markets, Internet Commerce, Benefits and Impacts of E-Commerce.
Elements of E-Commerce : Various elements, e-visibility, e-shops, Delivery of goods and services, Online payments, After - sales services, Internet E-Commerce security. **EDI and Electronic Payment Systems :** Introduction and definition of EDI, EDI layered Architecture, EDI technology and standards, EDI communications and transactions, Benefits and applications of EDI with example, Electronic Payment Systems: credit/debit/smart cards, e-credit accounts,e-money.

UNIT-2
Introduction to EC models : Inter-organization and intra-organization E-Commerce, E-Commerce Models: B2B, B2C, C2B, C2C, G2C, C2G. **E-Business :**Introduction to Internet bookshops, Grocery Suppliers, Software Supplies and support,Electronic newspapers, Virtual auctions, Online share dealing, e-diversity.

UNIT-3
E-Security and Legal Issues: Security concerns in E-Commerce, Privacy, integrity, authenticity, non-repudiation, confidentiality, SSL, Digital Signatures and fire walls, IT Act 2000,Cyber crimes and cyber laws.
Mobile Commerce and Future of E-Commerce : Introduction to Mobile Commerce, Benefits of Mobile Commerce, Impediments of M-Commerce, M-Commerce framework, Emerging and future trends.
References:

1. Alexis Leon, "ERP Demystified", Tata McGraw Hill
2. Rahul V. Altekar "Enterprisewide Resource Planning", Tata McGraw Hill,

3. Vinod Kumar Garg and Venkitakrishnan N K, "Enterprise Resource Planning – Concepts and Practice", PHI
4. Joseph A Brady, Ellen F Monk, Bret Wagner, "Concepts in Enterprise Resource Planning", Thompson Course Technology
5. Mary Summer, "Enterprise Resource Planning"- Pearson Education
6. Schneider P. Gary, Perry T.James, E-Commerce, Thomson Learning, Bombay.

Web Programming Lab

L	T	P	Cr		External Marks: 60
-	-	4	2		Internal Marks: 40

Time Duration: 3 Hrs.   **Total Marks: 100**

List of the Programs not limiting to:

Sr. No.	Title
1	Create a Web Page using basic tags in html 5
2	Write a program to create all types of list in HTML
3	Create a table using Html 5 and CSS
4	Write a program using labels, radio buttons, and submit buttons
5	Create a simple webpage using HTML
6	Use frames to Include Images and Videos.
7	Add a Cascading Style sheet for designing the web page.
8	Design a web page with validation using JavaScript.
9	How to make all fields of a form mandatory in java script
10	Create a registration form and validate it using java script
	Write a program to maintain session in PHP
11	Perform data base connectivity in PHP
12	Create a dynamic web page using PHP

BCA 5th Semester
Microprocessor and Interfacing LAB

L   T   P   Cr   External Marks: 60
-   -   4   2   Internal Marks: 40

Time duration: 3Hrs.   Total Marks: 100

Sr. No.	Title
1	Study of 8085 Microprocessor kit.
2	Write a program using 8085 and verify for : a. Addition of two 8-bit numbers. b. Addition of two 8-bit numbers (with carry).
3	Write a program using 8085 and verify for : a. 8-bit subtraction (display borrow) b. 16-bit subtraction (display borrow)
4	Write a program using 8085 for multiplication of two 8- bit numbers by repeated addition method. Check for minimum number of additions and test for typical data.
5	Write a program using 8085 for multiplication of two 8- bit numbers by bit rotation method and verify.
6	Write a program using 8085 for division of two 8- bit numbers by repeated subtraction method and test for typical data.
7	Write a program using 8085 for dividing two 8- bit numbers by bit rotation method and test for typical data.
8	Study of 8086 microprocessor kit
9	Write a program using 8086 for division of a defined double word (stored in a data segment) by another double Word division and verify.
10	Write a program using 8086 for finding the square root of a given number and verify.
11	Write a program using 8086 for copying 12 bytes of data from source to destination and verify.
12	Write a program using 8086 for copying 12 bytes of data from source to destination and verify.
13	Write a program using 8086 for arranging an array of numbers in descending order and verify.
14	Write a program using 8086 for arranging an array of numbers in ascending order and verify.
15	Write a program for finding square of a number using look-up table and verify.
16	Write a program to interface a two digit number using seven-segment LEDs. Use 8085/8086 microprocessor and 8255 PPI.
17	Write a program to control the operation of stepper motor using 8085/8086 microprocessor and 8255 PPI.

BCA 5th Semester
MINOR PROJECT

L   T   P   Cr   **External Marks: 60**
-   -   6   3   **Internal Marks: 40**

Time Duration: 3 Hrs.   **Total Marks: 100**

(GUIDELINES FOR MINOR PROJECT)

- The aim of the Minor Project(s) is to lay a foundation for Major Project to be carried out by the student during 6th Semester of BCA Programme.
- Each student should carry out Minor Project(s) using the software development tools/languages/technologies that they have learnt and/or have studied during the concerned semester.
- It should be compulsorily done by the student in-house under the supervision of the staff(s) assigned by Head of the Department/Director/Principal.

The Minor Project(s) will be assessed by the concerned supervisor(s) and shall award marks out of 25 for each student as Internal Assessment.

L   **T**   **P**   **Cr**   **External Marks: 60**
-   **-**   **2**   **2**   **Internal Marks: 40**

Time Duration: 3 Hrs.   **Total Marks: 100**

Industry Seminar Industry seminars are suggested to enable the students of BCA to appreciate the software development which are going on in industries in India. These seminars will help the students to face interviews with some confidence. The students should attend these and submit a report. The following points are listed to enable the college to organize these seminars.

BCA 6th Semester
ARTIFICIAL INTELLIGENCE

L	T	P	Cr		External Marks: 60
4	-	-	4		Internal Marks: 40

Time Duration: 3 Hrs.   **Total Marks: 100**

NOTE: Ten questions are to be set in all by the examiners by taking three questions from each unit and one compulsory question having 05 short answer type questions from all the units. Students will be required to attempt six questions in all including compulsory Question i.e. question No. 1 and by selecting not more than two questions from each unit.

Objectives:
- AI must improve with the progression of time and technology.
- AI must evolve in a direction that the masses demand.
- AI must have a mechanism whereby it can be reliably patched/updated, once it has been installed on a user's PC.
- AI must be developed in a modular fashion, by different contributors, where modules can be removed, added, modified and interchanged where necessary.
- AI's 'consciousness' must be fully transferable from PC to PC, to home/building, to car/vehicle, to robot.

UNIT - 1

Overview of A.I: Introduction to AI, Importance of AI, AI and its related field, AI techniques, Criteria for success. Problems, problem space and search: Defining the problem as a state space search, Production system and its characteristics, Issues in the design of the search problem Heuristic search techniques :Generate and test, hill climbing, best first search technique, problem reduction, constraint satisfaction.

UNIT - 2

Knowledge representation: Definition and importance of knowledge, Knowledge representation,various approaches used in knowledge representation, Issues in knowledge representation Using Predicate Logic: Represent ting Simple Facts in logic, Representing instances and is a relationship, Computable function and predicate.

UNIT - 3

Expert System: Introduction, Representing using domain specific knowledge, Expert system shells. LISP and other AI Programming Language Natural language processing, Introduction syntactic processing, Semantic processing, Discourse and pragmatic processing Learning: Introduction learning, Rote learning.
Reference :

1. D.W. Patterson, "Introduction to AI and Expert Systems", PHI, 1999
2. Nils J Nilsson ,"Artificial Intelligence -A new Synthesis" 2nd Edition (2000), Harcourt Asia Ltd.
3. E. Rich and K. Knight, "Artificial intelligence", TMH, 2nd ed., 1999.

BCA 6th Semester
COMPUTER GRAPHICS

L   T   P   Cr   **External Marks: 60**
4   -   -   4   **Internal Marks: 40**

Time Duration: 3 Hrs.   **Total Marks: 100**

NOTE: Ten questions are to be set in all by the examiners by taking three questions from each unit and one compulsory question having 05 short answer type questions from all the units. Students will be required to attempt six questions in all including compulsory Question i.e. question No. 1 and by selecting not more than two questions from each unit.

Objectives:
- This course is designed to provide a comprehensive introduction to computer graphics leading to the ability to understand contemporary terminology, progress, issues, and trends.
- A thorough introduction to computer graphics techniques, focusing on 3D modeling, image synthesis, and rendering.
- The interdisciplinary nature of computer graphics is emphasized in the wide variety of examples and applications.

UNIT –1

Input Devices: Keyboard, Touch Panel, Light Pens, Graphic Tablets, Joysticks, Trackball, Data Glove, Digitizers, Image Scanner, Mouse, Voice & Systems. Hardcopy Devices: Impact and Non Impact Printers, Such as Line Printer, Dot Matrix, Laser, Ink-jet, Electrostatic, Flatbed and Drum Plotters

UNIT –2

Video Display Devices: Refresh Cathode-Ray Tube, Raster Scan Displays, Random Scan Displays, Color CRT-Monitors, Direct View Storage Tube, Flat-Panel Displays; 3-D Viewing Devices, Raster Scan Systems, Random Scan Systems, Graphics Monitors and Workstations. Scan Conversion Algorithms for Line, Circle and Ellipse, Bresenham‟s Algorithms, Area Filling Techniques, Character Generation

UNIT– 3

2-Dimensional Graphics: Cartesian and Homogeneous Co-ordinate System, Geometric Transformations (Translation, Scaling, Rotation, Reflection, Shearing), Two-dimensional Viewing Transformation and Clipping (Line, Polygon and Text). 3-Dimensional Graphics: Geometric Transformations (Translation, Scaling, Rotation, Reflection, Shearing), Mathematics of Projections (Parallel & Perspective). 3-D Viewing Transformations and Clipping.

Reference Books:

1.   Foley, Van Dam, Feiner, Hughes, Computer Graphics Principles& practice,2000.
2.   D.J. Gibbs & D.C. Tsichritzs: Multimedia programming Object Environment& Frame work , 2000

3. Ralf Skinmeiz and Klana Naharstedt, Multimedia: computing, Communication and Applications, pearson, 2001
4. D.Haran & Baker. Computer Graphics Prentice Hall of India,1986

COMPUTER GRAPHICS LAB

L   T   P   Cr   **External Marks: 60**
   -   4   2   **Internal Marks: 40**

Time Duration: 3 Hrs.   **Total Marks: 100**

List of programs to be developed :

1. Write a program for 2D line drawing as Raster Graphics Display.
2. Write a program for circle drawing as Raster Graphics Display.
3. Write a program for polygon filling as Raster Graphics Display
4. Write a program for line clipping.
5. Write a program for polygon clipping.
6. Write a program for displaying 3D objects as 2D display using perspective transformation.
7. Write a program for rotation of a 3D object about arbitrary axis.
8. Write a program for Hidden surface removal from a 3D object.

Note:
At least 5 to 10 more exercises to be given by the teacher concerned.

BCA 6th Semester
ARTIFICIAL INTELLIGENCE LAB

L   T   P   Cr   **External Marks: 60**
-   4   2   **Internal Marks: 40**

Time Duration: 3 Hrs.   **Total Marks: 100**

List of programs to be developed using Prolog:

1. Study of PROLOG.
2. Write a program to solve 8 queens problem.
3. Solve any problem using depth first search.
4. Solve any problem using best first search.
5. Solve 8-puzzle problem using best first search
6. Solve Robot (traversal) problem using means End Analysis.
7. Solve traveling salesman problem.

Note:
At least 5 to 10 more exercises to be given by the teacher concerned.

BCA 6th Semester
SEMINAR

L   **T**   **P**   **Cr**   **External Marks: 60**
-   **-**   **2**   **2**   **Internal Marks: 40**

Time Duration: 3 Hrs.   **Total Marks: 100**

Industry Seminar Industry seminars are suggested to enable the students of BCA to appreciate the software development which are going on in industries in India. These seminars will help the students to face interviews with some confidence. The students should attend these and submit a report. The following points are listed to enable the college to organize these seminars.