



Program Name: Bachelor of Computer Applications
Program Code: CA301

SCHEME & SYLLABUS

**(Choice Based Credit System)
For**

Bachelor of Computer Applications

(w.e.f. Session 2016-17)



Syllabus (Session: 2016-2017)

Department of Computer Science & Application

RIMT UNIVERSITY, MANDIGOBINDGARH, PUNJAB

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SECTION 1**Vision & Mission of the University****VISION**

To become one of the most preferred learning places and a centre of excellence to promote and nurture future leaders who would facilitate the desired change in the society.

MISSION

- To impart teaching and learning through cutting-edge technologies supported by the world class infrastructure
- To empower and transform young minds into capable leaders and responsible citizens of India instilled with high ethical and moral values.
- To develop human potential to its fullest extent and make them emerge as world class leaders in their professions and enthuse them towards their social responsibilities.

SECTION 2**Vision and Mission of the Department****VISION**

Strives to groom students with diverse backgrounds into competitive software professionals with moral values and committed to build a vibrant nation.

MISSION

- To provide a strong theoretical and practical background across the computer science discipline with an emphasis on software development.
- To provide technical solutions in the field of Information technology to the local society.
- To provide need-based quality training in the field of Information Technology.
- To provide students with the tools to become productive, participating global citizens and life-long learners.

SECTION 3

Program Educational Objectives (PEOs), Program Outcomes (POs) and Program Specific Outcomes (PSOs)

PROGRAM EDUCATION OBJECTIVES (PEO)

PEO1	Demonstrate analytical and design skills including the ability to generate creative solutions and foster team-oriented professionalism through effective communication in their careers.
PEO2	Graduates would expertise in successful careers based on their understanding of formal and practical methods of application development using the concept of computer programming languages and design principles in national and international level.
PEO3	Exhibit the growth of the nation and society by implementing and acquiring knowledge of upliftment of health, safety and other societal issues.
PEO4	Implement their exhibiting critical thinking and problem- solving skills in professional practices or tackle social, technical and business challenges

PROGRAM OUTCOMES (PO)

Program Credits	150
Number of Semesters	Total 6 semester in 3 years
Program Outcomes(PO): on successful completion of this Program, the learner will be able to:	
PO1	Disciplinary knowledge: Apply the knowledge of mathematics, science, computing fundamentals, and a Computing specialization to the solution of complex problems.
PO2	Problem analysis: Identify, formulate, review research literature, and analyse complex computing problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and computing sciences.
PO3	Design/development of solutions: Design solutions for complex problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern Computer Science and IT tools including prediction and modelling to complex computing activities with an understanding of the limitations.

PO6	The Computer professional and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional computing practice.
PO7	Environment and sustainability: Understand the impact of the professional computing solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the computing practice.
PO9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	Communication: Communicate effectively on complex Computing activities with the Computer Science community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	Project management and finance: Demonstrate knowledge and understanding of the Computer Science and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	Lifelong learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSO)

Program Specific Outcomes(PSO's): on successful completion of this Program, the learner will be able to:



PO1	Knowledge of Computing Systems: An ability to understand the principles and working of computer systems.
PO2	Project Development Skills: An ability to understand the structure and development methodologies of software systems.
PO3	Software Development Skills: Familiarity and practical competence with a broad range of programming language and open-source platforms.
PO4	Mathematical Skills: An ability to apply mathematical methodologies to solve computation task, model real world problem using appropriate data structure and suitable algorithm.

SECTION 4**Curriculum / Scheme with Examination
Grading Scheme****SEMESTER WISE SUMMARY OF THE PROGRAMME:
(BCA)**

S. No.	Semester	No. of Contact Hours	Marks	Credits
1.	I	31	700	26
2.	II	21	700	26
3	III	21	700	24
4	IV	21	700	24
5	V	21	700	25
6	VI	21	700	25
	Total	126	4200	150



COURSE CATEGORY-WISE CREDIT DISTRIBUTION

EXAMINATION GRADING SCHEME

Marks Percentage Range	Grade	Grade Point	Qualitative Meaning
80-100	O	10	Outstanding
70-79	A+	9	Excellent
60-69	A	8	Very Good
55-59	B	7	Good
50-54	B	6	Above Average
45-49	C	5	Average
40-44	P	4	Fail
0-39	F	0	Fail
ABSENT	AB	0	Fail

Percentage Calculation: CGPA *10



Program Name: Bachelor of Computer Applications
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FIRST SEMESTER

Course		Contact Hours/Week			Credit	Contact Hrs.	Evaluation Scheme (% of Total Marks)			Exam Duration (Hours)
Course Code	Course Title	L	T	P			Internal	External	Total	
BCA1101	Introduction to Computers and IT	4	1	-	4.5	5	40	60	100	3 Hrs
BCA1102	Programming in C	4	1	-	4.5	5	40	60	100	3 Hrs
BCA1103	Personality Development-I	3	-	-	3	3	40	60	100	3 Hrs
BCA1104	System Analysis and Design	-	-	6	3	6	60	40	100	3 Hrs
BCA1105	Mathematical Foundation of Computer Science-I	3	1	-	3.5	4	40	60	100	3 Hrs
BCA1106	S/W Lab - I (Introduction to Computers and IT)	-	-	4	2	4	60	40	100	3 Hrs
BCA1107	S/W Lab – II (Programming in C)	-	-	4	2	4	60	40	100	3 Hrs
Total		14	3	14	22.5	31			700	



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SECOND SEMESTER

Course		Contact Hours/Week			Credit	Contact Hrs.	Evaluation Scheme (% of Total Marks)			Exam Duration (Hours)
Course Code	Course Title	L	T	P			Internal	External	Total	
BCA1201	Data Structure using C	4	1	-	4.5	5	40	60	100	3 Hrs
BCA1202	DCLD	4	1	-	4.5	5	40	60	100	3 Hrs
BCA1203	Communications-I	3	1	-	3.5	4	40	60	100	3 Hrs
BCA1204	Management Information System	4	1	-	4.5	5	40	60	100	3 Hrs
BCA1205	Mathematical Foundation of Computer Science-II	5	-	-	5	5	40	60	100	3 Hrs
BCA1206	S/W Lab – III (Data Structure using C)	-	-	4	2	4	60	40	100	3 Hrs
BCA1207	H/W Lab -I (DCLD)	-	-	4	2	4	60	40	100	3 Hrs
Total		20	5	8	26		Total		700	



THIRD SEMESTER

Course		Contact Hours/Week			Credit	Contact Hrs.	Evaluation Scheme (% of Total Marks)			Exam Duration (Hours)
Course Code	Course Title	L	T	P			Internal	External	Total	
BCA2301	Object Oriented Programming using C++	4	1	-	4.5	5	40	60	100	3 Hrs
BCA2302	Open Elective	4	1	-	4.5	5	40	60	100	3 Hrs
BCA2303	Database Management System	4	1	-	4.5	5	60	40	100	3 Hrs
BCA2304	Web Designing	4	1	-	4.5	5	60	40	100	3 Hrs
BCA2305	S/W Lab – IV (OOPS using C)	-	-	4	2	4	60	40	100	3 Hrs
BCA2306	S/W Lab – V (Database Management System)	-	-	4	2	4	60	40	100	3 Hrs
BCA2307	S/W Lab – VI (Web Designing)	-	-	4	2	4	60	40	100	3 Hrs
Total		16	4	12	24		16	4	700	



FOURTH SEMESTER

Course		Contact Hours/Week			Credit	Contact Hrs.	Evaluation Scheme (% of Total Marks)			Exam Duration (Hours)
Course Code	Course Title	L	T	P			Internal	External	Total	
BCA2401	Data Communication and Network	4	1	-	4.5	5	60	40	100	3 Hrs
BCA2402	RDBMS	4	1	-	4.5	5	60	40	100	3 Hrs
BCA2403	Visual Basic Programming	4	1	-	4.5	5	60	40	100	3 Hrs
BCA2404	Microprocessor and Microcontroller	4	1	-	4.5	5	60	40	100	3 Hrs
BCA2405	S/W Lab - VII (RDBMS)	-	-	4	2	4	60	40	100	3 Hrs
BCA2406	S/W Lab – VIII (Visual Basic Programming)	-	-	4	2	4	60	40	100	3 Hrs
BCA2407	Hardware Lab -II (Microprocessor and Microcontroller)	-	-	4	2	4	60	40	100	3 Hrs
Total		16	4	12	24				700	

FIFTH SEMESTER

Course		Contact Hours/Week			Credit	Contact Hrs.	Evaluation Scheme (% of Total Marks)			Exam Duration (Hours)
Course Code	Course Title	L	T	P			Internal	External	Total	
BCA3501	Computer Graphics	4	1	-	4.5	5	60	40	100	3 Hrs
BCA3502	Core Java	4	1	-	4.5	5	60	40	100	3 Hrs
BCA3503	Open Elective	4	1	-	4.5	5	60	40	100	3 Hrs
BCA3504	Data Warehouse and Mining	4	1	-	4.5	5	60	40	100	3 Hrs
BCA3505	S/W Lab -IX (Computer Graphics)	-	-	4	2	4	60	40	100	3 Hrs
BCA3506	S/W Lab -X (Core Java)	-	-	4	2	4	60	40	100	3 Hrs
BCA3507	S/W Lab -XI (Major Project - I)	-	-	6	3	6	60	40	100	3 Hrs
Total									700	



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SIXTH SEMESTER

Course		Contact Hours/Week			Credit	Contact Hrs.	Evaluation Scheme (% of Total Marks)			Exam Duration (Hours)
Course Code	Course Title	L	T	P			Internal	External	Total	
BCA3601	Advanced Java	4	1	-	4.5	5	60	40	100	3 Hrs
BCA3602	System Software	4	1	-	4.5	5	60	40	100	3 Hrs
BCA3603	Handling Operating System	4	1	-	4.5	5	60	40	100	3 Hrs
BCA3604	Principles of Management	4	1	-	4.5	5	60	40	100	3 Hrs
BCA3605	S/W Lab - XII (Advanced Java)	-	-	4	2	4	60	40	100	3 Hrs
BCA3606	S/W Lab -XIII (Handling Operating System)	-	-	4	2	4	60	40	100	3 Hrs
BCA3607	S/W Lab -XIV (Major Project - II)	-	-	6	3	6	60	40	100	3 Hrs
Total						34			700	



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SECTION 1

Detailed Syllabus with Course Outcomes

SYLLABUS SEMESTER-I

SUBJECT TITLE: Introduction to Computers and IT



SUBJECT CODE: BCA1101

SEMESTER: I

CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
4	1	0	4.5

Internal Assessment: 40

End Term Exam: 60

Duration of Exam; 3 Hrs

Course Objectives:

- Define and describe the hardware used in information technology (IT).
- Define and describe the types of software and Hardware used in IT.
- Demonstrate the ability to create and use documents, spreadsheets, presentations and databases in order to communicate and store information as well as to support problem solving

Contents of Syllabus:

Sr. No	Contents	Contact Hours
UNIT-I	Introduction- Characteristics of Computers, Evolution of computers, Capabilities and limitations of computers, Generations of computers, Types of computers(micro, mini, main frame, supercomputers), Block diagram of computer, Basic components of a computer system- Input unit, output unit, Arithmetic logic Unit, Control unit, central processing unit, Instruction set, registers, processor speed, type of processors, Memory- main memory organization, main memory capacity, RAM, ROM, EPROM, PROM, cache memory. Secondary Storage Devices- Magnetic Tape, Magnetic Disks-Internal Hard Disk, External Hard Drives, Floppy Disks, Optical Disks-CD, VCD, CD-R, CD-RW, DVD, Solid State Storage-Flash Memory, USB Drives.	15
UNIT-II	Input devices- Keyboard, Pointing Devices-mouse, Touch Screens, Joystick, Electronic pen, Trackball, Scanning Devices-Optical Scanners, OCR, OMR, Bar Code Readers, MICR, Digitizer, Electronic card reader, Image Capturing Devices-Digital Cameras. Output devices- Monitors- CRT, LCD/TFT, Printers- Dot matrix, Inkjet, Laser, Plotters- Drum, Flatbed, Screen Image Projector. Computer Software- Software and its Need, Types of software-System software, Application software, System software-operating system, utility program, programming languages, assemblers, compilers and interpreter.	15
UNIT-III	Application software and its types: word-processing, spreadsheet, presentation graphics, Data Base Management Software, Characteristics, Uses and examples and area of application of each of them, Virus working, features, types of viruses, virus detection prevention and cure.	10

UNIT-IV	Data communication and computer network- Basic elements of a communication system, data transmission modes, data transmission speed, data transmission media-twisted pair coaxial, fibre optic, Types of Networks-LAN, WAN, MAN, Internet, VPN, Topologies of LAN-ring, bus, star, mesh and tree topologies.	10
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Recommended Books:

1. Pardeep K. Sinha, Priti Sinha, Computer Fundamentals, BPB Publications.
2. Rajaraman, V., Fundamental of Computers. Prentice Hall India, New Delhi.

Instruction of Question Paper setter

Paper setters have to follow the following pattern while setting up the question paper.

Maximum Marks will be 60.

There will be three parts in the question paper

1. Part 1 (Question 1) will consists of 12 multiple choice questions having one mark each.
2. Part 2 (Questions 2 to 7) will consists of 6 questions each having 4 marks. There will be choice in the even number questions i.e Q. No 2, 4 and 6
3. Part 3 (Questions 8 to 10) will consists of 3 questions each having 8 marks. There will be choice in the odd number question i.e Q. No 9.

Course Outcome:

- Understanding the concept of input and output devices of Computers
- Learn the functional units and classify types of computers, how they process information and how individual computers interact with other computing systems and devices
- Understand an operating system and its working, and solve common problems related to operating systems.
- Learn basic word processing, spreadsheet and Presentation Graphics software skills.
- Study to use the Internet safely, legally, and responsibly



SUBJECT TITLE:

Programming in C SUBJECT CODE:

BCA1102 SEMESTER: I

CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
4	1	0	4.5

Internal Assessment: 40

End Term Exam: 60

Duration of Exam; 3 Hrs

Course Objective:

- To learn C Programming basics and the fundamentals of C
- To learn the basics of Control statements.
- To enhance problem solving and programming skills by implementing Functions, Arrays, Pointers, File management and dynamic memory allocation.

Contents of Syllabus:

Sr. No	Contents	Contact Hours
UNIT-I	Introductory Concepts- Introduction to computers, Computer characteristics, modes of operation, Types of programming languages, Introduction to C, some simple C programs, Desirable program characteristics. C Fundamentals- C character Set, Identifiers and keywords, data types, constants, variables and arrays, Declarations, expressions, statements, Symbolic constants. Operators and expressions Arithmetic operators, unary operator, Relational and logical operators, assignment operators, conditional operators, Library Functions.	20
UNIT-II	Data Input and Output- Preliminaries, single character input, single character output, Entering input data, writing output data, the gets and puts function. Preparing and Running a Complete C Program- Planning a program, Writing a C program, entering the program into the compiler, compiling and executing the program, error diagnosis, debugging techniques. Control Statements- Preliminaries, Branching, Looping, Nested control statements, switch statement, break statement, The continue statement, The goto statement, The comma operator.	10
UNIT-III	Arrays: Defining an array, processing an array, passing arrays to functions, Multidimensional arrays, Arrays and strings. Functions: A brief overview, Defining a function, accessing a function, function prototypes, passing arguments to a function, recursion.	10

UNIT-IV	Pointers- Fundamentals, Pointer declarations, Passing pointers to the functions, pointers and one dimensional array, dynamic memory allocation, Operations on pointers, arrays of pointers. Data files- Opening and closing a data file, creating a data file, processing a	10
	data file, unformatted data files.	

Recommended Books:

1. Byron Gottfried, Programming with C, Schaums Outlines, Tata McGraw Hill.
2. Mullis Cooper, Spirit of C, Jacob Publications.
3. Yashwant Kanetkar, Let us C, BPB.
4. Kerninghan B.W. & Ritchie D. M., The C Programming Language, PHI.

Instruction of Question Paper setter

Paper setters have to follow the following pattern while setting up the question paper.

Maximum Marks will be 60.

There will be three parts in the question paper

1. Part 1 (Question 1) will consists of 12 multiple choice questions having one mark each.
2. Part 2 (Questions 2 to 7) will consists of 6 questions each having 4 marks. There will be choice in the even number questions i.e Q. No 2, 4 and 6
3. Part 3 (Questions 8 to 10) will consists of 3 questions each having 8 marks. There will be choice in the odd number question i.e Q. No 9.

Course Outcomes:

- Identify the need and use of programming in real world environment.
- Understanding of using data types, variables and arithmetic operations in programming.
- Understand the fundamentals of control statements.
- Understand concept of functions, pointer and Array.
- Implement different Operations on structures, unions and files.



SUBJECT TITLE: Personality

Development-I SUBJECT CODE: BCA1103

SEMESTER: I

CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
3	0	0	3

Internal Assessment: 40

End Term Exam: 60

Duration of Exam; 3 Hrs

Course Objective :

- Know themselves better
- Identify their potential and accept their limitations.
- Consciously overcome their limitations and move towards self esteem.

Contents of Syllabus:

Sr. No	Contents	Contact Hours
UNIT-I	Self Analysis: SWOT Analysis, Who am I, Attributes, Importance of Self Confidence, Self Esteem. Creativity: Out of box thinking, Lateral Thinking.	10
UNIT-II	Attitude: Factors influencing Attitude, Challenges and lessons from Attitude, Etiquette. Motivation: Factors of motivation, Self talk, Intrinsic & Extrinsic Motivators. Goal Setting : Wish List, SMART Goals, Blue print for success, Short Term, Long Term, Life Time Goals.	15
UNIT-III	Time Management: Value of time, Diagnosing Time Management, Weekly Planner To do list, Prioritizing work. Extempore Gratitude: Understanding the relationship between Leadership Networking & Team work.	15
UNIT-IV	Team Work: Necessity of Team Work - Personally, Socially and Educationally. Leadership: Skills for a good Leader, Assessment of Leadership Skills.	10



Recommended Books:

1. Covey Sean, Seven Habits of Highly Effective Teens, New York, Fireside Publishers, 2nd Edition.
2. Carnegie Dale, How to win Friends and Influence People, New York: Simon & Schuster, 2nd Edition..
3. Daniel Coleman, Emotional Intelligence, Bantam Book, 2006
4. SOFT SKILLS, Career Development Centre, Green Pearl Publications, 2015.

Instruction of Question Paper setter

Paper setters have to follow the following pattern while setting up the question paper.

Maximum Marks will be 60.

There will be three parts in the question paper

1. Part 1 (Question 1) will consists of 12 multiple choice questions having one mark each.
2. Part 2 (Questions 2 to 7) will consists of 6 questions each having 4 marks. There will be choice in the even number questions i.e Q. No 2, 4 and 6
3. Part 3 (Questions 8 to 10) will consists of 3 questions each having 8 marks. There will be choice in the odd number question i.e Q. No 9.

Course Outcomes:

- Identify their own potentials and accept their limitations.
- Make use of techniques for self-awareness and self-development.
- Consciously overcome their limitations and move towards self-esteem.
- Understand the importance of team building and time management.
- Learn to overcome problems associated with personality.



SUBJECT TITLE: System Analysis and

Design SUBJECT CODE: BCA1104

SEMESTER: I

CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
4	1	0	4.5

Internal Assessment: 40

End Term Exam: 60

Duration of Exam; 3 Hrs

Course Objectives:

- Define various system analysis and design-based concepts and terminologies and different stages of the system development life cycle model.
- Compare, use and synthesize different conceptual modelling techniques for systems analysis (including DFDs and UML).
- Apply logic modelling techniques (decision tree/table, structured English).

Contents of Syllabus:

Sr. No	Contents	Contact Hours
UNIT-I	System Concept: System Concept, Element of the System, Types of System. System Development Life Cycle: Introduction, Consideration for Candidate Systems, Prototyping. The Role of the System Analyst: Introduction, Multi Faceted Role of the Analyst. System Planning and the Initial Investigation: Introduction, Base for Planning in System Analysis, Initial Investigation.	15
UNIT-II	Information Gathering: Introduction, Information Gathering Tools. The Tools of Structured Analysis: Introduction, the Tools of Structured Analysis, Pros & Cons of Each Tool. Feasibility Study: Introduction, System Performance Definition, Feasibility Study. Cost Benefit Analysis: Introduction, Cost Benefit Analysis, Procedure for Cost Benefit Determination.	15
UNIT-III	System Design: Introduction, the Process of Design, Design Methodology, Major Development Activities, Audit Considerations. Input/output and Form Design: Introduction, Input Design, Output Design, and Form Design.	10
UNIT-IV	System Implementation (System Testing & Quality Assurance): Introduction, the Test Plan, Quality Assurance, Levels of Quality Assurance, Role of Data Processing Auditor.	10



	Software Documentation: Requirement Documentation, Architecture/Design Documentation, Technical Documentation, User Documentation, Marketing Documentation, Documentation Standard, Online Documentation.	
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Recommended Books:

- 1) Edward,” System Analysis & Design “, Tata McGraw Hill, ISBN:8120317270
- 2) Elias Award, “System Analysis & Design”, Golgotha Publication, 2nd Ed, ISBN: 81751568-X
- 3) Rajaraman,” Analysis and Design of Information System”, PHI Publication, ISBN-8120312270

Instruction of Question Paper setter

Paper setters have to follow the following pattern while setting up the question paper.

Maximum Marks will be 60.

There will be three parts in the question paper

1. Part 1 (Question 1) will consists of 12 multiple choice questions having one mark each.
2. Part 2 (Questions 2 to 7) will consists of 6 questions each having 4 marks. There will be choice in the even number questions i.e Q. No 2, 4 and 6
3. Part 3 (Questions 8 to 10) will consists of 3 questions each having 8 marks. There will be choice in the odd number question i.e Q. No 9.

Course Outcome:

- Learn different types of information system in an organization like MIS & DSS and understand the phases for SDLC.
- Able to gather data to analyze and specify the requirements of a system.
- Develop and analyze data flow diagrams and explain how to develop the project budget.
- Design system input/output components and environments and also describe the process of moving from logical to physical data models.
- Understand the techniques in testing phase for better quality assurance.



SUBJECT TITLE: Mathematical Foundation of

Computer Science-I SUBJECT CODE: BCA1105

SEMESTER: I

CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
5	1	0	5.5

Internal Assessment: 40

End Term Exam: 60

Duration of Exam; 3 Hrs

Course Objectives:

- To introduce the fundamental ideas of the Matrices and determinants and set theory.
- To help the students to use of differentiation and integration to solve many mathematical problems.
- To give exposure of mathematical topics for their study of computer science

Contents of Syllabus:

Sr. No	Contents	Contact Hours
UNIT-I	Matrices and Determinants: Introduction and definition of matrices, Types of matrices, matrix addition and scalar multiplication, transpose and inverse of matrix, solution of system of linear equations using matrices and Cramer rule, definition and properties of determinants (statement only), characteristics polynomial, eigen values, nature of eigen values , certain types of matrices, Cayley – Hamilton theorem.	15
UNIT-II	Set Theory, Relation: Elements of set, methods of describing a set, types of sets, operation on sets – union, intersection and difference of sets, Venn diagrams, statement problems, Associative laws, Distributive laws, DeMorgan’s laws, duality, partitioning of a set. Basic definition of Relation and types of relations, graphs of relations, properties of relations (domain, range, inverse and composite relations).	15
UNIT-III	Differentiation and Integration: Laws of derivative, Chain rule, Differentiation using log, repeated derivatives, derivatives of implicit functions. Integration of algebraic, Logarithmic and Exponential function, Integration of functions using partial fraction (Simple form using properties), Integration of functions by parts, Definite integral.	10

UNIT-IV	Probability: Mathematical and Statistical probability, axiomatic approach to probability, Elementary events, Sample space, Compound events, Types of events, Mutually exclusive, Independent events, addition law of probability,	10
	Conditional probability, Multiplication theorem of probability, Baye's Theorem.	

Recommended Books:

1. Text Book of Engineering Mathematics by N.P. Bali.
2. Higher Engineering Mathematics by B.S. Grewa.

Instruction of Question Paper setter

Paper setters have to follow the following pattern while setting up the question paper.

Maximum Marks will be 60.

There will be three parts in the question paper

1. Part 1 (Question 1) will consists of 12 multiple choice questions having one mark each.
2. Part 2 (Questions 2 to 7) will consists of 6 questions each having 4 marks. There will be choice in the even number questions i.e Q. No 2, 4 and 6
3. Part 3 (Questions 8 to 10) will consists of 3 questions each having 8 marks. There will be choice in the odd number question i.e Q. No 9.

Course Outcome:

- After the successful completion of this course student will be able to identify domain and range of a function and relation, helps to use of their notation and evaluation.
- The student will be able to work with matrices in many problems and learn to compute determinants.
- This course provides the knowledge to find derivatives of exponential, logarithmic functions and parametric form.
- During this course students know the importance of integration in many problems and their use.
- With the knowledge of probability, students will be able to solve many problems in daily life.



SUBJECT TITLE: S/W Lab - I (Introduction to

Computers and IT) SUBJECT CODE: BCA1106

SEMESTER: I

CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
0	0	4	2

Internal Assessment: 60

End Term Exam: 40

Duration of Exam; 3 Hrs

Course Objectives:

- Define and describe the hardware used in information technology (IT).
- Define and describe the types of software and Hardware used in IT.
- Demonstrate the ability to create and use documents, spreadsheets, presentations and databases in order to communicate and store information as well as to support problem solving

Contents of Syllabus:

Sr. No	Contents	Contact Hours																				
UNIT-I	MS-DOS Internal and External Commands: attrib, backup batch bcdedit bootcfg bootsect break, cd chkdsk cls cmd color command copy ,date del delete deltree dir diskcopy ,echo edit fdisk md mkdir mode move undelete unformat ver vol, xcopy.	10																				
UNIT-II	<p>MS-WORD</p> <ul style="list-style-type: none"> • Creating, Editing and Deleting images (Paint) • Customize Desktop and Creating Folder and Briefcase on Desktop through accessories • Save your work as on my Desktop. • Page Layout as Horizontal and Vertical • Run the spell checker and Text Alignment • Use of Formatting tools • Add a header to the document and write your Name and Surname. • Create a table as shown below. <table border="1" data-bbox="349 1675 1383 1915"> <thead> <tr> <th>Roll Number</th> <th>Name</th> <th>English</th> <th>Math</th> </tr> </thead> <tbody> <tr> <td>145123</td> <td>Reshma</td> <td>85</td> <td>88</td> </tr> <tr> <td>145124</td> <td>Kiran</td> <td>55</td> <td>62</td> </tr> <tr> <td>145125</td> <td>Gurbir</td> <td>53</td> <td>49</td> </tr> <tr> <td>145126</td> <td>Vicky</td> <td>45</td> <td>70</td> </tr> </tbody> </table>	Roll Number	Name	English	Math	145123	Reshma	85	88	145124	Kiran	55	62	145125	Gurbir	53	49	145126	Vicky	45	70	20
Roll Number	Name	English	Math																			
145123	Reshma	85	88																			
145124	Kiran	55	62																			
145125	Gurbir	53	49																			
145126	Vicky	45	70																			

	<ul style="list-style-type: none"> Insert a row between Krishna and Ram and add the following data: 				
	Krishna	Ram	42	25	48
	<ul style="list-style-type: none"> Highlight the 2nd row and right-align the data. Apply superscript to the word “ Xuereb” and change it to capital letters. Below the table insert a picture about Computers from clip art. Using the help function, search using the word “ Table” choose “Delete a cell , row , or column from a table”. Copy the first point stating “ Select the cells.....delete” and paste it under the table. Set the magnification to 75% 21)Set the top margin to 3 cm. 20)Save your work and close Microsoft word. Create Mail Merge with using student information to represent their class performance. 				
UNIT-III	MS-Excel <ul style="list-style-type: none"> Create a Personal Monthly Budget through worksheet Create a sale report of any organization and also represent through various charts. Insert picture and data sorting, filtering and using conditional formatting in MS-Excel Use different functions in MS-Excel Macro and how it is used in MS Excel 				10
UNIT-IV	MS-PowerPoint <ul style="list-style-type: none"> To change your slide layout To change your background color To make design changes that will apply to ALL slides 				10

Course Outcome:

- Understand the basic concept of Microsoft Disk Operating System Internal and External command interface.
- Work on MS Paint and its also learn to save images on different modes.
- Learn how to write a various types of letters and manage with latesttools of MS-Word.
- Understand and execute the MS Excel functions, graphs and manage organizational data.
- Study how to prepare and present the slides on different aspects.



SUBJECT TITLE: S/W Lab – II

(Programming in C) SUBJECT CODE: BCA1107

SEMESTER: I

CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
0	0	4	2

Internal Assessment: 60

End Term Exam: 40

Duration of Exam; 3 Hrs

Course Objective:

- The purpose of the course is to provide students with an understanding of C programming Concepts.
- To learn How to create ,implement and debug the program.
- To learn how to optimize the solution using Functions, Arrays, Pointers, Structures.

Contents of Syllabus:

Contents	
1.	Conversion of any mathematical equation into C format and its evaluation
2.	Evaluation of any mathematical Expression and identify the hierarchy
3.	C program to reverse any given number
4.	C program to find the day of any given date in a calendar
5.	C program to check whether a triangle is valid or not when the three angles are entered using keyboard.
6.	C program to check whether a triangle is valid or not when the three sides are entered using keyboard.(Triangle is valid if the sum of two sides are greater than the largest side)
7.	C program to find the greatest among the three numbers using conditional operator
8.	C program to check whether the entered number is prime or not
9.	C program to print prime numbers between 1 to 100
10.	C program to print various patterns
	* A B C D E F G F E D C B A
	*** A B C D E F F E D C B A
	***** A B C D E E D C B A
	***** A B C D D C B A
	A B C C B A
	A B B A
11.	C program to print the multiplication table of the number entered by the user
12.	C program to evaluate the compound interest using the formula as $a=p(1+r/q)^{nq}$ where q =number of times per year r=annual rate, n=number of years, p=principle amount
13.	C program to find the factorial of a number entered by the user
14.	C program to generate the Fibonacci series upto n terms
15.	C program which is menu driven to havig following options:
	i. Factorial of a number

- ii. Prime or not
- iii. Odd or even
- iv. Exit
16. C program to find the sum of digits
 - i. Without using recursion
 - ii. using recursion
17. C Program to Swap of two no's using third variable
18. C Program to Swap of two no's without using third variable
19. C program for array addition
20. C program for array multiplication
21. C program for transpose of a matrix
22. C menu driven program that depicts the working of a library. The menu option would be:
 - i. Add book information
 - ii. Display book information
 - iii. List all the books for a given author
 - iv. List the title of a specified book
 - v. List the count of books in the library
 - vi. List the books in order of accession number
 - vii. Exit

Course Outcome:

- Understand to create, save, compile and run a program In C.
- Understand and develop programming skills using the fundamentals and basics of C Language.
- Develop programs using the basic elements like control statements.
- Develop programs using Arrays and Strings.
- Implement structures, functions and pointers.



Program Name: Bachelor of Computer Applications
Program Code: CA301

SECTION 2

Detailed Syllabus with Course Outcomes

SYLLABUS SEMESTER-2



SUBJECT TITLE: Data

Structure using C SUBJECT CODE:

BCA1201 SEMESTER: II

CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
4	1	0	4.5

Internal Assessment: 40

End Term Exam: 60

Duration of Exam; 3 Hrs

Course Objective:

- To provide the knowledge of basic data structures and their implementations.
- To understand importance of data structures in context of writing efficient programs.
- To develop skills to apply appropriate data structures in problem solving.

Contents of Syllabus:

Sr. No	Contents	Contact Hours
UNIT-I	Need of algorithm, Time Space trade off, Big O Notation, Arrays, Multi Dimensional Arrays, Memory Representation of arrays, Operations (Insertion, Deletion and Traversal) on Arrays Sorting (Bubble, Insertion, Selection), Searching (Linear, Binary)	15
UNIT-II	Linked Lists, Memory Representation of Linked Lists, Operations (Insertion, Deletion and Traversal) on linked list Stacks, Operations(Push and Pop) on Stacks, Memory representation of stack using array and linked List, Applications of Stacks; Infix to Prefix Conversion; Infix to Post-fix conversion; Postfix to prefix conversion; postfix to infix conversion; Evaluation of Postfix expression	20
UNIT-III	Queues, Operations (Insertion, Deletion and Traversal) on Queues, Circular Queues; Dequeue; Priority Queue,	5
UNIT-IV	Basic concept and terminologies of Trees, Binary Trees, Complete Binary Tree, Traversal of a Binary Tree, Memory Representation of a Binary Trees, Binary Search Tree Graphs, Memory Representation of Graphs	10



Recommended Books:

1. Radhakrishnan, M, Data Structuring Using C.
2. Weiss, Mark Allen, Data Structures & Algorithm Analysis in C

Instruction of Question Paper setter

Paper setters have to follow the following pattern while setting up the question paper.

Maximum Marks will be 60.

There will be three parts in the question paper

1. Part 1 (Question 1) will consists of 12 multiple choice questions having one mark each.
2. Part 2 (Questions 2 to 7) will consists of 6 questions each having 4 marks. There will be choice in the even number questions i.e Q. No 2, 4 and 6
3. Part 3 (Questions 8 to 10) will consists of 3 questions each having 8 marks. There will be choice in the odd number question i.e Q. No 9.

Course Outcome:

- Understand the concept of algorithm and complexity to choose appropriate solution to problem.
- Understanding basic data structure such as array, linked list, Stacks, Queues.
- Implement different types of trees and apply them to problem solutions.
- To learn graph structure and various operations on graphs and their applicability.
- Apply Algorithm for solving problems like sorting, searching, insertion and deletion of data



SUBJECT TITLE:

DCLD SUBJECT CODE: BCA1202

SEMESTER: II

CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
4	1	0	4.5

Internal Assessment: 40

End Term Exam: 60

Duration of Exam; 3 Hrs

Course Objective:

- To acquire the basic knowledge of digital logic levels and application of knowledge to understand digital electronics circuits.
- To introduce the organization of a computer and its principal components, viz, ALU, Control, Memory and Input/output.
- To prepare students to perform the analysis and design of various digital electronic circuits.

Contents of Syllabus:

Sr. No	Contents	Contact Hours
UNIT-I	Number System: Introduction, number conversion system, Binary Arithmetic (Binary Addition, Binary Subtraction, Binary Multiplication, Binary Division), 1's and 2's complement, Subtraction using 2's Complement. Codes: BCD Code, Excess3 Code, Grey Code, cyclic codes. Logic Gates: Basic gates, Universal Gates, Combinational Gates, Applications of gates.	20
UNIT-II	Boolean algebra, Minimization techniques, canonical forms of Boolean expressions, K-Map, Don't Care Conditions, Adders, Subtractors, 2's compliment Adder-Subtractor circuit. Combinational Circuits: Multiplexer, Multiplexer Tree, Demultiplexer, Decoder, Encoder, code converters.	10
UNIT-III	Sequential Circuits: Latch, Flip Flops- R-S Flip-Flop, J-K Flip-Flop, Master-Slave J-K Flip-Flop, Race Condition, Removing Race Condition, D Flip-Flop, T Flip-Flop, Applications of Flip-Flops.	10
UNIT-IV	Counters, Design of Asynchronous Counters, Design of Synchronous Counters, Up-Down Counters, MOD-N Counters	10

Recommended Books:

1. Integrated Electronics by Millman, Halkias McGraw Hill.
2. Malvino: Digital Computer Electronics, McGraw Hill.
3. Modern Digital Electronics, R. P. Jain, Fourth Edition, TMH
4. Ujjenbeck, John: Digital Electronics: A Modern Approach, Prentice Hall, 4th.
5. Mano, M. Morris: Digital Logic and Computer Design, Edition, 3rd.

Instruction of Question Paper setter

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Maximum Marks will be 60.

There will be three parts in the question paper

1. Part 1 (Question 1) will consists of 12 multiple choice questions having one mark each.
2. Part 2 (Questions 2 to 7) will consists of 6 questions each having 4 marks. There will be choice in the even number questions i.e Q. No 2, 4 and 6
3. Part 3 (Questions 8 to 10) will consists of 3 questions each having 8 marks. There will be choice in the odd number question i.e Q. No 9.

Course Outcome:

- Convert decimal number into binary, octal and hexa decimal system and also to apply them for real life problems.
- Minimize the digital circuits by simplification of the expression using Boolean algebra.
- Design efficient combinational and sequential circuit's from functional description of digital system.
- Identify and prevent various hazards and timing problems.
- Design the circuits for any real life problems with the knowledge of digital systems.



SUBJECT TITLE:

Communications-I SUBJECT CODE:

BCA1203 SEMESTER: II

CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
3	1	0	3.5

Internal Assessment: 40

End Term Exam: 60

Duration of Exam; 3 Hrs

Course Objective:

- To create awareness among students concerning various ramifications of communication.
- 2. To encourage the students to develop and inculcate optimism and to gain self-confidence.
- To encourage the students to cultivate the capacity to accept challenges and manage the impact of adversity.

Contents of Syllabus:

Sr. No	Contents	Contact Hours
UNIT-I	Speaking and Conversational Skills: Components of a meaningful and easy conversation; understanding the cue and making appropriate responses; forms of polite speech; asking and providing information on general topics. The study of sounds of English, stress, Situation based Conversation in English, Essentials of Spoken English, Sentence, Parts of speech, Tenses, Active passive voice, Direct Indirect speech, Creative writing & vocabulary	10
UNIT-II	Reading Skills: Reading Tactics and strategies; Reading purposes—kinds of purposes and associated comprehension; Reading for direct meanings; Reading for understanding concepts, details, coherence, logical progression and meanings of phrases/ expressions. Writing Skills: Guidelines for effective writing; Principles of Letter Writing: Nature and Functions of Letters, writing styles for application, resume personal letter, official / business letter, memo, notices etc.; outline and revision, Summary of Distinctive Features of Business Letters. Listening Skills: Barriers to listening; effective listening skills; feedback skills. Attending telephone calls; note taking. Non-verbal Communication; Barriers to Communications; Global Aspects; Ethical; Legal Aspects.	20
UNIT-III	Business and technical reports: Characteristics; Importance; types; Routine reports, Source of Data; Evolution of Material, note making, organizing Material; principles of Organization; Writing the report: Rough Draft;	10

	<p>Process of Writing; Order of Writing; the Final Draft; Check-list for Reports.</p> <p>Oral Presentation : Importance of Acquiring Oral Presentation Skills; Styles of Presentation, Body Language; Voice Modulation; Audience Awareness; Presentation Plan; Visual Aids; use of Connectives; Check lists; Evaluation; brochure; Conducting a Meeting; Participating in a Meeting.</p>	
UNIT-IV	<p>Elements of Style: The Scientific Attitude; Readability.</p> <p>Technical Description: techniques of Description; Describing machines and Mechanisms; Describing Process; Sample Descriptions</p> <p>Group Discussion: Definition; Process; Guidelines; Helpful expressions; Evaluation.</p>	10

Recommended Books:

1. Oxford Guide to Effective Writing and Speaking by John Seely.
2. English Grammar in Use (Fourth Edition) by Raymond Murphy, CUP

Instruction of Question Paper setter

Paper setters have to follow the following pattern while setting up the question paper.

Maximum Marks will be 60.

There will be three parts in the question paper

1. Part 1 (Question 1) will consist of 12 multiple choice questions having one mark each.
2. Part 2 (Questions 2 to 7) will consist of 6 questions each having 4 marks. There will be choice in the even number questions i.e. Q. No 2, 4 and 6
3. Part 3 (Questions 8 to 10) will consist of 3 questions each having 8 marks. There will be choice in the odd number question i.e. Q. No 9.

Course Outcome:

- Make the students confident in speaking fluently and enthusiastically in English.
- Improve technical and professional communication skills.
- To train the students and make them comprehend various aspects of presentation skills.
- Learn active listening skills.
- Develop effective professional writing skills.



SUBJECT TITLE: Management

Information System SUBJECT CODE: BCA1204

SEMESTER: II

CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
4	1	0	4.5

Internal Assessment: 40

End Term Exam: 60

Duration of Exam; 3 Hrs

Course Objectives: After completing requirements for this course, the student will be able to:

- Provide students with comprehensive knowledge and technical skills needed to successfully participate in and support the increasingly applied role of information technology in corporate decision making.
- Enable graduates to conceptualize and manage the specification, design and implementation of applied information systems.
- Enhance self-confidence, ability to make proper decisions and effective communication and also provide the knowledge of contemporary issues related to the field of managing information system.

Contents of Syllabus:

Sr. No	Contents	Contact Hours
UNIT-I	Information and System Concepts: Information: A Definition; Types of Information (Strategic Information, Tactical Information, Operational Information); Information Quality; Kinds of Systems (Abstract and Physical Systems, Deterministic and Probabilistic Systems, Open and Closed Systems, User-Machine Systems); Human as an Information Processing System (Information Filtering, Human Differences in Information Processing, Implications for Information Systems).	20

UNIT-II	<p>Management Information Systems: A Framework: Importance of MIS; Management Information System : A Concept (Management, Information, System); MIS : A Definition (Information Technology and MIS); Nature and Scope of MIS (MIS Characteristics, MIS Functions).</p> <p>Structure and Classification of MIS : Structure of MIS (MIS Structure Bases on Physical Components, Information System Processing Functions, Decision Support, Levels of Management Activities, Organisational Functions); MIS Classification (Transaction Processing System, Management Information System (MIS), Decision Support System (DSS), Executive Support System, Office Automation Systems (OASs), Business</p>	20
	Expert Systems (BESs)	
UNIT-III	Decision Making and MIS : Decision-Making, Simon’s Model of Decision-Making, Types of Decisions (Purpose of Decision-Making, Level of Programmability, Knowledge of Outcomes);	5
UNIT-IV	Implementation and Evaluation of MIS : Implementation process (planning and implementation, acquisition of facilities and space planning, MIS Organization and procedure development, User training, acquisition of hardware and software, Creation of forms and database, Testing, Change Over); Evaluation of MIS (Evaluation Approaches, Evaluation Classes, Product Based MIS Evaluation, Cost/Benefit Based Evaluation)	5

Recommended Books:

1. Management Information Systems, Goyal, D.P., Third Edition, Macmillan.
2. Management Information Systems, Oz, Effy, Thomson Press Indian Edition.
3. Management Information Systems, Kanter, J., Third Edition, PHI.
4. Management Information Systems, Davis, Gordan B. & Olson, M.H, Second Edition

Instruction of Question Paper setter

Paper setters have to follow the following pattern while setting up the question paper.

Maximum Marks will be 60.

There will be three parts in the question paper

1. Part 1 (Question 1) will consists of 12 multiple choice questions having one mark each.



2. Part 2 (Questions 2 to 7) will consists of 6 questions each having 4 marks. There will be choice in the even number questions i.e Q. No 2, 4 and 6
3. Part 3 (Questions 8 to 10) will consists of 3 questions each having 8 marks. There will be choice in the odd number question i.e Q. No 9.

Course Outcome:

- Understand the roles of Information systems in contemporary organizations.
 - Learn various types of information systems at various levels of the organizations.
 - Learn how to analyze and design an information system based on user requirements.
 - Understand the strategic role of information systems and information technology in organizations.
 - Learn and use of management information systems within an information systems environment.
- [IS]



SUBJECT TITLE: Mathematical Foundation of

Computer Science-II SUBJECT CODE: BCA1205

SEMESTER: II

CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
5	0	0	5

Internal Assessment: 40

End Term Exam: 60

Duration of Exam; 3 Hrs

Course Objectives:

- Enhance ability of research, inquiry and analytical thinking in mathematical Problems
- Help better understanding of concepts like recurrence, Graph Theory and mathematical logic
- Know the use of gained knowledge in various fields of computer science like switching theory, logical designs, artificial language and computer graphics etc.

Contents of Syllabus:

Sr. No	Contents	Contact Hours
UNIT-I	RELATIONS & DIAGRAPHS: Cartesian product of sets, Binary relations, Representation of relations on finite sets, Path in relations & diagraphs, Types of relations, Composition of relations. FUNCTIONS: Definition & notation of a function, Types of functions, Invertible functions, Composition of functions, Functions for computer science, Set representation in a Computer, Greatest common divisor, Least Common Multiple.	20
UNIT-II	STATISTICS- Introduction to statistics, measures of central tendency - mean, median and mode, measures of dispersion, mean deviation, standard deviation and coefficient of variation. RECURRENCE: Recurrence relation, linear recurrence relation with constant coefficients, Solution of Linear recurrence relation with constant coefficients, Solution of non-homogeneous recurrence relations, Methods of generating functions.	15

UNIT-III	MATHEMATICAL LOGIC : Prepositional Calculus, Basic Logical operations (Conjunction, disjunction, Negation, derived connectives), Statements generated by a set, conditional statements, Converse Inverse &Contingency, Argument, Methods of proof, Equivalence & Implication, St20atement Calculus.	10
UNIT-IV	BOOLEAN ALGEBRA: Laws of Boolean algebra, Basic Theorems, Duality Principle, Boolean Functions, Applications of Boolean Algebra.	5

Recommended Books:

1. Lipschutz, Seymour, Discrete Mathematics (Schaum Series)
2. Kolman, Bernard, Discrete Mathematical Structures
3. S.B. Singh, Discrete Structures
4. Bhupinder Singh, Discrete Mathematics & Its Applications
5. Rm. Somasundram, Discrete Mathematical Structures.

Instruction of Question Paper setter

Paper setters have to follow the following pattern while setting up the question paper.

Maximum Marks will be 60.

There will be three parts in the question paper

1. Part 1 (Question 1) will consists of 12 multiple choice questions having one mark each.
2. Part 2 (Questions 2 to 7) will consists of 6 questions each having 4 marks. There will be choice in the even number questions i.e Q. No 2, 4 and 6
3. Part 3 (Questions 8 to 10) will consists of 3 questions each having 8 marks. There will be choice in the odd number question i.e Q. No 9.

Course Outcome:

- The student will be able to identify types of sets, representation of relations on finite sets and path in relations.
- The students know notation and Composition of relation with their inverse.
- This course provides the knowledge to solve linear recurrence relations by recognizing homogeneity, linearity, constant coefficients, degree, and characteristic equation.
- This course will develop statistical skills to measures of central tendency and dispersion.
- This course will provide ability to learn to relate Boolean operations to equivalent truth table and logic gates.



SUBJECT TITLE: S/W Lab – III (Data Structure

using C) SUBJECT CODE: BCA1206

SEMESTER: II

CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
0	0	4	2

Internal Assessment: 60

End Term Exam: 40

Duration of Exam; 3 Hrs

Course Objective:

- To Implement linear and non-linear data structures.
- Identify suitable data structure to solve various computing problems.
- Analyze various algorithms based on their time and space complexity.

Contents of Syllabus:

Sr. No	Contents	Contact Hours
UNIT-I	<ul style="list-style-type: none">• A menu driven program for all the operations in Array• A menu driven program for all the operations in Stack using array	10
UNIT-II	<ul style="list-style-type: none">• A menu driven program for all the operations in Queue using array• A menu driven program for all the operations in Linked List	10
UNIT-III	<ul style="list-style-type: none">• A menu driven program for all the operations in Stack using Linked List• A menu driven program for all the operations in Queue using Linked List	10
UNIT-IV	<ul style="list-style-type: none">• Program for Linear and Binary Search• Program for Insertion sort, Bubble Sort, Selection Sort	10

Course Outcomes:

- Applying knowledge on implementing operations on various Data structure like: Array, Linked list, Stack, Queue.
- Ability to design programs for Tree Traversals, Graph traversals etc.
- Implement and know the application of algorithms for sorting and searching.
- Ability to solve problems implementing appropriate data structures.
- Implementing knowledge to make optimized code for problem solving.



SUBJECT TITLE: H/W

Lab -I (DCLD) SUBJECT CODE:

BCA1207 SEMESTER: II

CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
0	0	4	2

Internal Assessment: 60

End Term Exam: 40

Duration of Exam; 3 Hrs

Course Objective:

- Design and implement combinational logic circuits.
- Design and implement sequential logic circuits.
- Design, Analysis, Implementation of application level projects

Contents of Syllabus:

Sr. No	Contents	Contact Hours
UNIT-I	<ul style="list-style-type: none">• To study the function of basic logic gates and verify the truth table of AND, OR, NOT.• To study the function of universal logic gates and verify the truth table NAND, NOR.	10
UNIT-II	<ul style="list-style-type: none">• To study the function of combinational gates and verify the truth table X-OR, X-NOR• To verify the truth table of Full-Adder and Subtractor.	10
UNIT-III	<ul style="list-style-type: none">• To design and verify the truth table of full adder using half adders.• To study the BCD to binary and binary to BCD Code converter.• Study of Decoder Circuits: BCD-to-Decimal Decoder	10
UNIT-IV	<ul style="list-style-type: none">• To study the flip flop circuit using Gates: R-S,J-K, Master Slave J-K,D-Flip Flop• Study of Ring Counter.• Study of Asynchronous and Synchronous Counters.	10

Course Outcome:

- Design, Analysis, Implementation and testing of logic gates and functions.
- Design, Analysis, Implementation and testing of combinational circuits.
- Design, Analysis, Implementation and testing of flip-flops and registers.
- Design, Analysis, Implementation and testing of counters.
- Design, Analysis, Implementation of application level projects.



Program Name: Bachelor of Computer Applications
Program Code: CA301

SECTION 3

Detailed Syllabus with Course Outcomes

SYLLABUS SEMESTER-3



SUBJECT TITLE: Object Oriented Programming using C++

SUBJECT CODE: BCA2301

SEMESTER: III

CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
4	1	0	4.5

Internal Assessment: 40

End Term Exam: 60

Duration of Exam; 3 Hrs

Course Objective :'

- To learn programming from real world examples.
- To understand Object oriented approach for finding Solutions to various problems with the help of C++ language.
- To learn various concepts of object oriented approach towards problem solving.

Contents of Syllabus:

Sr. No	Contents	Contact Hours
UNIT-I	Introduction C++, Variable, constant, Expression, Statements, Comments and keywords of C++. Operator: Arithmetic, Relational, Logical, Assignment, Increment/Decrement, Conditional, Precedence of Operators. Data type, Type Conversion, library function. Input / Output Statements Inputting using in and outputting using cout statements. Basic program construction. . A Complete C++ Program: Invoking Turbo C++, naming your program, using the editor, saving your program, compiling and linking, running the program. Decision Making and Looping Statement: If Statement, If..Else statement, nesting of if statement,	20

<p>UNIT-II</p>	<p>switch statement, conditional operator statement. While loop, do loop, for loop, nesting of loops, break and continue statement, go to statement. Arrays: Defining an array, array type, array elements, Accessing and averaging array elements, initializing array. Programming of C++ with array, String handling, array of strings.</p> <p>Functions: What is a function? Declaring and defining function. Local, global variables, execution of function, passing argument to function. Return values, Reference arguments, Overloading functions. Inline function and default parameter.</p> <p>Class Declaration: Data Members, Member Functions, Private and Public</p>	<p>15</p>
	<p>Members, Data Hiding and Encapsulation, Array within a class.</p>	
<p>UNIT-III</p>	<p>Class Function Definition: Member Function definition inside the class and outside the class, Friend Function, Inline Function, Static Members & Functions, Scope Resolution Operator, Private and Public Member Functions, Nesting of Member Functions. Creating Objects, Accessing class data members, Accessing member functions, Arrays of Objects, Objects as function arguments.</p> <p>Constructors and Destructors: Declaration and Definition, Default Constructors, Parameterized Constructors, Constructor Overloading, Copy Constructors. Destructors: Definition and use.</p>	<p>15</p>
<p>UNIT-IV</p>	<p>Function Overloading & Operator Overloading: Binary & Unary.</p> <p>Inheritance - Extending Classes Concept of inheritance, Base class, Derived class, Defining derived classes, Visibility modes : Private, public, protected; Single inheritance : Privately derived, Publicly derived; Making a protected member inheritable, Access Control to private and protected members by member functions of a derived class, Multilevel inheritance, Nesting of classes. Polymorphism: Definition, early Binding, Polymorphism with pointers, Virtual Functions, late binding, pure virtual functions.</p>	<p>10</p>

Recommended Books:

1. Object Oriented Programming with C++, E.Balagurusami, Fourth Edition, Tata Mc-Graw Hill
2. C++ Programming Language, Bjarne Stroustrup, 3rd Edition, Addison-Wesley Publishing Company.
3. Object Oriented Programming Using C++, Salaria, R. S, Fourth Edition, Khanna Book Publishing.

Instruction of Question Paper setter

Paper setters have to follow the following pattern while setting up the question paper.

Maximum Marks will be 60.



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1. Part 1 (Question 1) will consists of 12 multiple choice questions having one mark each.
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3. Part 3 (Questions 8 to 10) will consists of 3 questions each having 8 marks. There will be choice in the odd number question i.e Q. No 9.



Course Outcome:

- Understand the basics of c++ and to understand how C++ improves C with object-oriented features.
- To implement different looping statements, arrays and string handling functions.
- Apply the concepts of Classes & Objects, friendfunction , constructors & destructors in program design.
- Create functions, Static Members & Functions inside and outside the class with the use of scope resolution operator.
- Design & implement various forms of inheritance, runtime polymorphism and compile time polymorphism.

SUBJECT TITLE: Database Management System

SUBJECT CODE: BCA2303

SEMESTER: III

CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
4	1	0	4.5

Internal Assessment: 40

End Term Exam: 60

Duration of Exam; 3 Hrs

Course Objective:

- Familiarize the students with a good formal foundation on the concepts of Database management systems, databases and relational model.
- Outline the various systematic database design approaches.
- Describe the concepts of transactions, techniques related to concurrency and recovery manager.

Contents of Syllabus:

Sr. No	Contents	Contact Hours
UNIT-I	Introduction to data, field, record, file, database, database management system, Structure of database system, Advantage and disadvantage, levels of database system, Relational model, hierarchical model, network model, comparison of these models, E-R diagram, different keys used in a relational system, SQL.	20

UNIT-II	DBA, responsibilities of DBA, Physical and Logical data independence, Relational form like 1NF, 2NF, 3NF, BCNF, 4thNF, 5thNF, DBTG, join, normalization.	10
UNIT-III	Concurrency control and its management, protection, security, recovery of database, Integrity and Control, Disaster Management	10
UNIT-IV	SQL *PLUS :Introduction to Oracle–8, SQL–DDL, DML, DCL, Join methods & sub query, Union Intersection, Minus, Built in Functions, Views, Sequences, Indexing, PL/SQL: Introduction to PL/SQL, Cursors–Implicit & Explicit, Procedures, Functions & Packages Database Triggers.	10

Recommended Books:

1. Introduction to Database System By C.J. Date.
2. Database Management System By B.C. Desai.
3. Database Concept by Korth.
4. Oracle –Developer –2000 by Ivan Bayross.
5. Database System concepts & Oracle (SQL/PLSQ) –AP Publishers

Instruction of Question Paper setter

Paper setters have to follow the following pattern while setting up the question paper.

Maximum Marks will be 60.

There will be three parts in the question paper

1. Part 1 (Question 1) will consists of 12 multiple choice questions having one mark each.
2. Part 2 (Questions 2 to 7) will consists of 6 questions each having 4 marks. There will be choice in the even number questions i.e Q. No 2, 4 and 6
3. Part 3 (Questions 8 to 10) will consists of 3 questions each having 8 marks. There will be choice in the odd number question i.e Q. No 9.

Course Outcome:

- Know about the basic functioning of various parts of computer system from hardware point of view and interfacing of various peripheral devices used with the system.
- Understand instruction format, its processing cycle.
- Compare RISC, CISC based computers.
- Examine the communication among various peripherals through input and output interface.
- Understand memory management techniques like associative mapping, cache memory.



SUBJECT TITLE: Web

Designing SUBJECT CODE: BCA2304

SEMESTER: III

CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
4	1	0	4.5

Internal Assessment: 40

End Term Exam: 60

Duration of Exam; 3 Hrs

Course Objective:

- To introduce the fundamentals of Internet, and the principles of web design.
- To construct basic websites using HTML and Cascading Style Sheets.
- To build dynamic web pages with validation using Java Script objects and by applying different event handling mechanisms.

Contents of Syllabus:

Sr. No	Contents	Contact Hours
UNIT-I	Introduction to Web Development, Introduction to Web and Webpage, Static Web, Dynamic Web, Systematic Approach to Web Creation, Creating Interactive and Dynamic Web Pages, Factors in commercial Web Design, Phases of Web site development, Web and Database Integration.	15
UNIT-II	HTML Overview, Structure of HTML documents, HTML tags Elements, The<HEAD> element, The <BODY> element, Text formatting, Text styles, Lists: ordered, unordered and definition lists, Adding graphics, Tables, Linking documents, Working with images, images as hyperlinks, Frames and layers, Frames and layers, Data collection using forms	15
UNIT-III	DHTML – An Introduction, Components of DHTML, Static Vs. Dynamic Web Page, HTML Vs. DHTML, CSS Introduction, CSS Levels, Consistent Web Designing Using CSS, CSS Id and Class.	10
UNIT-IV	Introduction to JavaScript, Embedding Javascript in HTML, Javascript Statements, Variables, Data types, Conditional statements, Looping statements, Functions, Form validation, Objects, DOM, Event handling, Event handling.	10

Recommended Books:

1. Thomas A. Powell, "HTML: The Complete Reference", Osborne/McGraw-Hill
2. Bayross, "Web Enabled Commercial Applications Development Using HTML, DHTML, Java Script, Perl CGI," Third Edition, BPB Publications.
3. Scott Mitchell, "Designing Active Server Pages," O'Reilly, 2000.
4. Keith Morneau, Jill Batistick, "Active Server Pages", First Edition, Vikas Thomson Learning, 2000.

Instruction of Question Paper setter

Paper setters have to follow the following pattern while setting up the question paper.

Maximum Marks will be 60.

There will be three parts in the question paper

1. Part 1 (Question 1) will consist of 12 multiple choice questions having one mark each.
2. Part 2 (Questions 2 to 7) will consist of 6 questions each having 4 marks. There will be choice in the even number questions i.e. Q. No 2, 4 and 6
3. Part 3 (Questions 8 to 10) will consist of 3 questions each having 8 marks. There will be choice in the odd number question i.e. Q. No 9.

Course Outcome:

- Identify the basic concepts of database systems, file system, Role of DBA.
- Describe the concept of DBMS Architecture, Data Base Models, ER Model, Concurrency Control and Recovery.
- Analyze the different normalization techniques which possess no anomalies in design a database.
- Formulate DDL, DML, DCL commands using various queries in SQL.
- Evaluate various programs conditional control, iterative by gaining the complete knowledge of PL/SQL.



SUBJECT TITLE: S/W Lab – IV (OOPS)

using C) **SUBJECT CODE: BCA2305**

SEMESTER: III

CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
0	0	4	2

Internal Assessment: 40

End Term Exam: 60

Duration of Exam; 3 Hrs

Course Objective :'

- To learn programming from real world examples.
- To understand Object oriented approach for finding Solutions to various problems with the help of C++ language.
- To learn various concepts of object oriented approach towards problem solving.

Contents of Syllabus:

Sr. No	Contents	Contact Hours
UNIT-I	<ul style="list-style-type: none">• WAP to find the factorial of a given number.• WAP to print the table of a given number• WAP to implement the concept of scope resolution operator in C++.	10
UNIT-II	<ul style="list-style-type: none">• WAP to implement constructor overloading.• WAP to implement destructor in C++.• Friend function to access private contents of a class.• WAP to implement Function overloading.	10
UNIT-III	<ul style="list-style-type: none">• WAP to implement single inheritance.• WAP to implement Multiple inheritance.• WAP to implement multi-level Inheritance.• WAP to implement hybrid inheritance.	10
UNIT-IV	<ul style="list-style-type: none">• WAP to implement Hierarchical inheritance.• WAP to implement Unary operator overloading.• WAP to implement Binary operator overloading.• WAP to implement Virtual function.• WAP to create and open a file to write/read data.	10



Course Outcome:

- Implement programs to understand difference between C and C++.
- To implement different looping statements, arrays and control statements.
- Implement object oriented concepts such as classes, objects, encapsulation and data abstraction.
- Create different types of functions, constructors and destructors.
- Demonstrate the use of inheritance and polymorphism.

SUBJECT TITLE: S/W Lab – V (Database Management System)

SUBJECT CODE: BCA2306

SEMESTER: III

CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
0	0	4	2

Internal Assessment: 40

End Term Exam: 60

Duration of Exam; 3 Hrs

Course Objectives:

- Enhance the students knowledge how to create and design a table, manipulate and query databases in MS Access.
- Describe how to use Access to generate reports and produce input user forms.
- Understanding of SQL syntax used with MySQL..

Contents of Syllabus:

Sr. No	Contents	Contact Hours
UNIT-I	<ul style="list-style-type: none">• Creating Database in MS-Access using wizard and design view.• Creating tables in wizard, Datasheet mode and in Design view• Implementation of different Data types and format available in Access• Implementation of Field properties and primary key in Design view.	10
UNIT-II	<ul style="list-style-type: none">• Implementation of hiding or unhiding columns, sorting data, editing data and updating data .• Changing the view of table, saving table, import data, export data.• Creating relationship b/w tables i.e one-to-one, one-to-many, many-to-many.• Creating query using menu driven interface and query wizard.	10
UNIT-III	<ul style="list-style-type: none">• Creating query using design view, implement criteria i.e where clause, or, and.• Queries using multiple tables with criteria.	10

	<ul style="list-style-type: none"> • Modify query and creating new query using existing queries. • Use query to make a table, parameter query, update query and crosstab query. • Creating form by using wizard in columnar, tabular, datasheet and Justified layout. • Creating form by using Design view and implement tools in design view. 	
UNIT-IV	<ul style="list-style-type: none"> • Create split form, multiple items form, modify a form. • Editing form – grid lines, resizing objects, tab order, form appearance, header and footer. • Form control - List box, combo box, Check box, option button, Command button ext. • Sorting and filtering data in forms. Filter by selection, filter by form. • Hide or unhide columns in forms, Freeze columns. • Creating Reports using wizard, Group, using summarize option in report. • Creating report in design view, implement tools in report. 	10

Course Outcome:

- Creating tables by using different Data types and format in wizard, Data-sheet mode and in Design view in MS Access.
- Creating query using menu driven interface and query wizard. Apply various relationship b/w the existing data of the table in MS Access.
- Implement form by using wizard in columnar, tabular, datasheet and Justified layout. Creating Reports using wizard, design view, implement tools in report in MS Access.
- Create SQL queries on DDL, DML, DCL statements.
- Implement various programs using conditional control, iterative control in PL/SQL.



SUBJECT TITLE: S/W Lab – VI (Web

Designing) SUBJECT CODE: BCA2307

SEMESTER: III

CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
0	0	4	2

Internal Assessment: 40

End Term Exam: 60

Duration of Exam; 3 Hrs

Course Objective:

- To design and develop static and dynamic web pages.
- To study the concepts of web applications this includes CSS and Javascript.
- To study formatting and validating web pages.

Contents of Syllabus:

Sr. No	Contents	Contact Hours
UNIT-I	<ul style="list-style-type: none">• Create a web page to show the structure of HTML.• Show the use of formatting tags in HTML• Write HTML code to show the use of absolute and relative URL with anchor tag..	10
UNIT-II	<ul style="list-style-type: none">• Show the use of image tag and show images as buttons.• Create a web page to show the use of image maps.• Create a table in which colspan and rowspan elements are used.	10
UNIT-III	<ul style="list-style-type: none">• Create a webpage to show the use of different lists available in HTML.• Create a webpage to show the use of frame tag in HTML.	10
UNIT-IV	<ul style="list-style-type: none">• Create admission form for a college.• Create a webpage to show the use of different types of CSS. Create a webpage to show the DHTML properties	10

Course Outcome:

- Understand, analyze and apply the role of languages like HTML, DHTML, CSS and JavaScript.
- Analyze a web page and identify its elements and attributes.
- Create web pages using HTML, DHTML and Cascading Style Sheets.
- Create dynamic web pages using JavaScript.
- Describe the usage of Client Side Scripting using Javascript in web development.



Program Name: Bachelor of Computer Applications
Program Code: CA301

SECTION 4

Detailed Syllabus with Course Outcomes

SYLLABUS SEMESTER-4



SUBJECT TITLE: Data Communication and Network

SUBJECT CODE: BCA2401

SEMESTER: IV

CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
4	1	0	4.5

Internal Assessment: 40

End Term Exam: 60

Duration of Exam; 3 Hrs

Course Objective:

1. To understand the basic concepts of data communication, transmission media, OSI & TCP/IP reference models.
2. To understand the concept of flow control, error control and LAN protocol.
3. To learn the conceptsof various Switching techniques and Network Security.

Students are expected to / able to:

- Familiar with the different Network Models.
- Understand different network technologies
- Understand the effects of using different networking topologies
- Updated with different advanced network technologies that can be used to connect different networks
- Familiar with various hardware and software that can help protect the network

Contents of Syllabus:

Sr. No	Contents	Contact Hours
UNIT-I	Introduction: Network Definition, Basic Components of a Network, Network types and topologies, Uses of Computer Networks, Network Architecture. Transmission Media: Coaxial cable, twisted pair cable, fibre optics & satellites. OSI reference model, TCP/IP reference model, comparison of OSI and TCP reference model.	15



UNIT-II	Introduction to Analog and Digital Transmission: Telephone system, Modems, Types of modems, pulse code modulation. Local Area Network Protocols: CSMA Protocols, BRAP, MLMA, IEEE standards 802, Token Bus, Token Ring, FDDI.	10
UNIT-III	Data Link Layer Design Issues: Services provided to Network layer framing, error control, flow control, link management. Error detection	13

	&correction, Elementary Datalink Protocols. Design Issues of Network Layer: Services provided to transport layer, routing, connection, internet & World Wide Web. Transmission & Switching: Multiplexing, circuit switching, packet switching, hybrid switching, ISDN service transmission.	
UNIT-IV	Naming & Addressing: Hierarchical Naming, Addressing, Telephone Networks, Internet, IPv4, Subnetting Ipv4 Networks, Private Networks, Asynchronous Transfer Mode, Name Resolution, Address Resolution Protocol (Arp), RARP Routing : Routing Information, Routing Protocols, Hierarchical Routing, Multicast Routing. Network Security and Privacy: Brief Introduction to Cryptography. Network Services: File transfer, Access & Management, Electronic Mail, Remote login	15

Recommended Books:

- Tannanbum, A.S.: Computer Networks, Prentice Hall, 3rd Edition.
- 2. Stallings, William: Local Networks: An Introduction: Macmillan Publishing Co.
- 3. Stallings, William: Data Computer Communication, Macmillan Publishing Co.

Instruction of Question Paper setter

Paper setters have to follow the following pattern while setting up the question paper.

Maximum Marks will be 60.

There will be three parts in the question paper

1. Part 1 (Question 1) will consists of 12 multiple choice questions having one mark each.



2. Part 2 (Questions 2 to 7) will consists of 6 questions each having 4 marks. There will be choice in the even number questions i.e Q. No 2, 4 and 6
3. Part 3 (Questions 8 to 10) will consists of 3 questions each having 8 marks. There will be choice in the odd number question i.e Q. No 9.



Course Outcome:

- Describe basic computer network technology and transmission media used in Data Communication Networks.
- Analyze layers functionalities of OSI model and TCP/IP.
- Ability to understand the detection and correction techniques.
- Familiar with working of different multiplexing, Switching methods, flow control and buffering.
- Analyze the various routing algorithms and Network Security, Privacy and Services methods.

SUBJECT TITLE: RDBMS

SUBJECT CODE: BCA2402

SEMESTER: IV

CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
4	1	0	4.5

Internal Assessment: 40

End Term Exam: 60

Duration of Exam; 3 Hrs

Course Objective:

1. To study the physical and logical database designs, database modeling, relational, hierarchical, and network models.
2. To familiar with the database design by normalization and concurrency control.
3. To learn and understand the concepts of the SQL commands and PL/SQL programs.

Contents of Syllabus:

Sr. No	Contents	Contact Hours
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UNIT-I	<p>An Overview of DBMS and DB Systems Architecture : Introduction to Database Management systems; Data Models; Database System Architecture; Relational Database Management systems; Candidate Key and Primary Key in a Relation; Foreign Keys; Relational Operators; Set Operations on Relations; Attribute domains and their Implementation.</p> <p>The Normalization Process : Introduction; first Normal Form; data Anomalies in 1NF Relations; Partial Dependencies; Second Normal Form; data Anomalies in 2NF Relations; Transitive Dependencies; Third Normal Form; data Anomalies in 3NF Relations;</p> <p>The Entity Relation Ship Model : The Entity Relationship Model; Entities and Attributes; Relationships; One-One Relationships; Many-to-one</p>	20
	Relationships; Normalizing the Model; Table instance charts	
UNIT-II	<p>Interactive SQL : SQL commands ; Data Definition Language Commands; Data Manipulation Language Commands; The Data types a cell can hold; insertion of data into the tables; Viewing of data into the tables; Deletion operations; updating the contents of the table; modifying the structure of the table; renaming table; destroying tables; Data Constraints; Type of Data Constraint; Column Level Constraint; Table Level Constraint; Null value Concepts; The UNIQUE Constraint; The PRIMARY constraint; The FOREIGN key constraint; The CHECK Constraint; Viewing the User Constraints</p> <p>Viewing The Data : Computations on Table Data; Arithmetic Operators; Logical Operators; Comparison Operators; Range Searching; Pattern Searching; ORACLE FUNCTIONS; Number Functions; Group Functions; Scalar Functions; Data Conversion Functions; Manipulating Dates in SQL ; Character Functions;</p>	20
UNIT-III	<p>Sub queries and Joins : Joins; Equi Joins; Non Equi Joins; Self Joins; Outer Joins; SubQueries; Correlated Queries; Using Set Operators:- Union , Intersect; Minus ;Views and Indexes : Definition and Advantages Views; Creating and Altering Views; Using Views; Indexed Views; Partitioned views; Definition and Advantages of Indexes; Composite Index and Unique Indexes; Accessing Data With and without Indexes; Creating Indexes and Statistics.</p>	10



UNIT-IV	Introduction to PL/SQL : Advantage of PL/SQL; The Generic PL/SQL Block; The Declaration Section; The Begin Section; The End Section; The Character set; Literals; PL/SQL Data types; Variables; Constants; Logical Comparison; Conditional Control in PL/SQL; Iterative Control; Advanced PL/SQL : Types of Cursors; Implicit Cursor; Explicit Cursor; Explicit Cursor attributes; Cursor For Loop; Parameterized Cursor; Error Handling in PL/sql; Internal Exceptions; User Defined Exceptions	10
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Recommended Books:

1. Ullman, Principles of Database Systems
2. Oracle –Developer –2000 by Ivan Bayross.
3. Database System concepts & Oracle (SQL/PLSQ) –AP Publishers



Instruction of Question Paper setter

Paper setters have to follow the following pattern while setting up the question paper.

Maximum Marks will be 60.

There will be three parts in the question paper

1. Part 1 (Question 1) will consists of 12 multiple choice questions having one mark each.
2. Part 2 (Questions 2 to 7) will consists of 6 questions each having 4 marks. There will be choice in the even number questions i.e Q. No 2, 4 and 6
3. Part 3 (Questions 8 to 10) will consists of 3 questions each having 8 marks. There will be choice in the odd number question i.e Q. No 9.

Course Outcome:

- Describe the fundamental elements of relational database, design and explain basic concepts of relational models.
- Analyze different normalization techniques and apply them in design database which possess no anomalies.
- Formulate SQL queries on data.
- Illustrate the various concepts of PL/SQL and analyze programs conditional control, iterative Control.
- Evaluate various programs in cursor for loop , error handling in PL/SQL.



SUBJECT TITLE: Visual Basic

Programming SUBJECT CODE: BCA2403

SEMESTER: IV

CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
4	1	0	4.5

Internal Assessment: 40

End Term Exam: 60

Duration of Exam; 3 Hrs

Course Objective:

- To learn advanced features of the visual programming.
- To learn the basic principles of Visual programming.
- To enhance problem solving and programming skills in visual programming with extensive programming projects.

Contents of Syllabus:

Sr. No	Contents	Contact Hours
UNIT-I	<p>Introduction to Visual Basic: The Visual Basic Program Development Process; the Visual Basic</p> <p>Environment; Opening a Visual Basic Project; Saving a Visual Basic Project; Running a Visual Basic Project. Visual Basic Fundamentals: Constants; Variables; Data Types and Data Declarations; Operators and Expressions; String Expressions; Library functions , Branching and Looping Statements, Relational Operators and Logical Expressions; Branching with the if -Then Block; Branching with if-Then -Else Blocks; Selection: Select-case; Looping with for-Next; Looping With Do-Loop; Looping with While- Wend</p> <p>Visual Basic Control Fundamentals: Visual Basic Control Tools; Control tool Categories; Working with controls; Naming Forms and Controls;</p> <p>Assigning Property Values to Forms and Controls; Executing Commands (Event Procedures and Command Buttons). Display Output Data (Labels and Text Boxes); Entering Input data (Text Boxes); selecting Multiple Features(Check Boxes); selecting Exclusive Alternatives(Option Button and Frames). Assigning Properties Collectively (The With Block); Generating Error Messages (The MsgBox Function); Creating Times Events; Scrollbars.</p>	20

UNIT-II	Menus and Dialog Boxes :Building Drop-down Menus; accessing a Menu from the Keyboard; Menu Enhancements; Submenus; Pop-up Menus; Dialog Boxes; Input Box. Executing and Debugging a New Project : Syntax Errors; Logical Errors; Setting break Points; Defining Watch Values; Stepping Through a Program; User- Induced Errors; Error Handlers. Procedures: Modules and Procedures; Sub Procedure; Event Procedures; Function. Arrays: Array Characteristics; Array declarations; Processing Array Elements; Passing Arrays to Procedures; Dynamic Arrays; Array-Related Functions; Control Arrays	10
UNIT-III	Using Class Modules: Object Oriented Principles; Creating Class Modules; Using Class Modules Adding Properties and Events and Methods. Using COM Components : Introduction to ActiveX Components and Component Object Model; Benefits of COM; Clients and Servers; Types of ActiveX Components Available in Visual Basic; Creating user defines ActiveX Components; Managing Components; The Visual Component Manager; Registering and Un Registering Components. ActiveX Controls : Creating an ActiveX Control; Benefits of ActiveX Control; Adding Properties; Methods and Events to the Control; Managing and Distribution of the Control; Built-in Active X Controls. ActiveX EXE and ActiveX DLL: Introduction to ActiveX DLL and EXE; Creating ActiveX EXE Component; Creating ActiveX DLL Component .	10
UNIT-IV	Data Access using ADO : Data Access Technology with VB ; The ActiveX Data Object Model; Advantages of ADO and OLEDB; Connecting to a Data Source; Retrieving from a Data Source; Sorting and Searching Data; Updating Data; Creating Dynamic Record Sets; Using Cursors; Cursor Types; Locking; Accessing ADO Data Control. Data Environment and Data Report: Introduction; Data Environment Designers; Working with Data Reports; Cut different types of Data Reports.	10

Recommended Books:

Visual Basic 6 from the Ground Up, Gary Cornell, Paperback Edition, TMH

Essentials of Visual Basic 6.0 Programming, David I. Schneider, First Edition, Prentice Hall

Visual Basic 6: The Complete Reference, Noel Jerke, First Edition, TMH

Instruction of Question Paper setter

Paper setters have to follow the following pattern while setting up the question paper.

Maximum Marks will be 60.



There will be three parts in the question paper

1. Part 1 (Question 1) will consists of 12 multiple choice questions having one mark each.
2. Part 2 (Questions 2 to 7) will consists of 6 questions each having 4 marks. There will be choice in the even number questions i.e Q. No 2, 4 and 6
3. Part 3 (Questions 8 to 10) will consists of 3 questions each having 8 marks. There will be choice in the odd number question i.e Q. No 9.

Course Outcome:

- Identify the need and use of programming in real world environment.
- Understanding of using data types, variables and arithmetic operations in programming.
- Understand the fundamentals of control statements.
- Understand concept of functions, pointer and Array.
- Implement different Operations on structures, unions and files.



SUBJECT TITLE: Microprocessor and

Microcontroller SUBJECT CODE: BCA2404

SEMESTER: IV

CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
4	1	0	4.5

Internal Assessment: 40

End Term Exam: 60

Duration of Exam; 3 Hrs

Course Objective:

- To introduce students with the architecture and operation of typical microprocessors and microcontrollers.
- To familiarize the students with the assemble language programming and interfacing of microprocessors and microcontrollers.
- To provide strong foundation for designing real world applications using microprocessors and microcontrollers.

Contents of Syllabus:

Sr. No	Contents	Contact Hours
UNIT-I	Introduction to Microprocessors: Historical Background of Microprocessors, Applications of Microprocessors, Introduction to 8085, Architecture of 8085, Pin Diagram of 8085.	12
UNIT-II	Instruction Cycle, Timing Diagrams of Memory Read/Write Operations & timing diagrams of various Instructions, Addressing Modes, Instruction Set, Data Transfer Instructions, Arithmetic Instructions, Logical Instructions, Branch Instructions, Control Instructions, RISC & CISC Processors.	13
UNIT-III	Introduction to Microcontrollers: Architecture of Microcontroller, Microcontroller Resources, Resources in Advanced and Next Generation Microcontroller, 8051	12
UNIT-IV	Microcontroller, Peripheral Devices and Controllers: Introduction and Architecture of DMA Controller 8257, Architecture of Programmable Interrupt Controller 8259.	13

Recommended Books:

1. Microprocessor Architecture, Programming and Applications with 8085, Ramesh. S. Gaonkar, Fourth Edition, Penram International Publishing
2. 8051 Microcontroller and Embedded Systems , Muhammad Ali Mazidi Janice Gillispie Mazidi, Second Edition, PHI
3. Fundamentals of Microprocessors and Microcomputers, B. Ram, Fourth Edition, Dhanpat Rai Publications
4. The Intel Microprocessors 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium Pro Architecture, Programming and Interfacing, B. Brey, Fifth Edition, Prentice Hall International

Instruction of Question Paper setter

Paper setters have to follow the following pattern while setting up the question paper.

Maximum Marks will be 60.

There will be three parts in the question paper

1. Part 1 (Question 1) will consists of 12 multiple choice questions having one mark each.
2. Part 2 (Questions 2 to 7) will consists of 6 questions each having 4 marks. There will be choice in the even number questions i.e Q. No 2, 4 and 6
3. Part 3 (Questions 8 to 10) will consists of 3 questions each having 8 marks. There will be choice in the odd number question i.e Q. No 9.

Course Outcome:

- Understand architecture and operations of a 8085 microprocessor system in depth.
- Understand instruction set, memory read/write operations of 8085 microprocessor.
- Analyze, specify, design, write and test assembly language programs of moderate complexity.
- Gain insight of concepts of microcontroller.
- Articulate the interfacing of interrupt controller and DMA controller with microprocessor.



SUBJECT TITLE: S/W Lab - VII

(RDBMS) SUBJECT CODE: BCA2405

SEMESTER: IV

CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
0	0	4	2

Internal Assessment: 40

End Term Exam: 60

Duration of Exam; 3 Hrs

Course Objective:

1. To understand and work with different types of SQL statements.
2. To learn and work with Joins and sub-queries.
3. To learn and constructs the PL/SQL programs with conditional control statements, Stored Procedures and Functions.

Contents of Syllabus:

Sr. No	Contents	Contact Hours
	This laboratory course will comprise as exercises to supplement what is learnt under paper BCA2405 RDBMS using Oracle.	

Course Outcome:

- Create queries on DDL, DML, DCL by using statements SQL(Structured Query Language).
- Apply various aggregate functions related queries in SQL to retrieve any type of information from a table in data base.
- Implement Select, Nested queries, join on the existing tables in database .
- Implement basics, conditional control, iterative Control, programs in PL/SQL.
- Evaluation of error handling by using cursors and triggers that helps in faster programming in PL/SQL.



SUBJECT TITLE: S/W Lab – VIII (Visual Basic

Programming) SUBJECT CODE: BCA2406

SEMESTER: IV

CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
0	0	4	2

Internal Assessment: 40

End Term Exam: 60

Duration of Exam; 3 Hrs

Course Objective:

- To learn utilizing tools of the visual environment such as commands, menus and toolbars.
- To learn the Implementing SDI and MDI Applications.
- To Learn to design Event-driven applications.

Contents of Syllabus:

Sr. No	Contents	Contact Hours
	Practical file needs to be maintained that covers the topics under paper BCA 2406: Visual Basic Programming.	

Course Outcome:

- Understand to create, build, and debug *Visual Basic* applications.
- Understand to Assigning Property Values to Forms and Controls.
- Demonstrate fundamental skills in utilizing the tools of a visual environment such as command, menus and toolbars.
- Implement SDI and MDI applications using forms, dialogs, and other types of GUI components.
- Design and develop the event- driven applications using Visual Basic framework



SUBJECT TITLE: Hardware Lab -II (Microprocessor and

Microcontroller) SUBJECT CODE: BCA2407

SEMESTER: IV

CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
0	0	4	2

Internal Assessment: 40

End Term Exam: 60

Duration of Exam; 3 Hrs

Course Objective:

- To study programming based on 8086 microprocessor and 8051 microcontroller.
- To study 8085 microprocessor based ALP using arithmetic, logical and shift operations.
- To learn the design aspects of I/O and Memory Interfacing circuits.

Contents of Syllabus:

Sr. No	Contents	Contact Hours
UNIT-I	1. To examine and modify the contents of a register and memory location. 2. To add two 8-bit hexadecimal numbers without considering the carry generated. 3. To add two 8-bit hexadecimal numbers considering the carry generated.	15
UNIT-II	4. To subtract two 8-bit hexadecimal numbers without considering borrow. 5. To subtract two 8-bit hexadecimal numbers considering borrow. 6. To add two 8-bit hexadecimal nos. The result should not be greater than 199. 7. To add two 16- bit hexadecimal numbers without considering the carry generated.	12
UNIT-III	8. To add two 16- bit hexadecimal numbers considering the carry generated. 9. To subtract two 16-bit numbers without considering borrow. 10. To subtract two 16-bit numbers considering borrow. 11. To find 2's complement of 8-bit hexadecimal number.	13
UNIT-IV	12. To add series of 8- bit hexadecimal numbers neglecting the carry	12



	generated.	
	13. To separate 8-bit hexadecimal number into two digits (Breaking the byte into two nibbles).	
	14. To arrange the series of 8-bit hexadecimal numbers in ascending order.	
	15. To arrange the series of 8-bit hexadecimal numbers in descending order	

Course Outcome:

- Understand the fundamentals of assembly level programming of microprocessors.
- Apply the programming knowledge for arithmetic and logical operations in 8085.
- Develop the programs for sorting.
- Develop the programs for Branch Instructions, Control Instructions.
- Apply the programming knowledge for understanding of communication standards in 8085.



Program Name: Bachelor of Computer Applications
Program Code: CA301

SECTION 5

Detailed Syllabus with Course Outcomes

SYLLABUS SEMESTER-5



SUBJECT TITLE: Computer Graphics

SUBJECT CODE: BCA3501

SEMESTER: V

CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
4	1	0	4.5

Internal Assessment: 40

End Term Exam: 60

Duration of Exam; 3 Hrs

Course Objective

- Introduce students with fundamental concepts and theory of Computer graphics.
- It presents the important drawing algorithm, clipping and 2-D transformation curves
- It provides basic knowledge of 3-D graphics.

Contents of Syllabus:

Sr. No	Contents	Contact Hours
UNIT-I	Overview of Graphics system: Computer Graphics and their applications, Introduction to Active and Passive Graphics Input devices: light pens, Graphic tablets, Joysticks, Trackball, Data Glove, Digitizers, Image scanner, Graphs and Types of Graphs. Display Devices: CRT Monitors (Random –Scan and Raster Scan, DVST, Plasma –Panel Display, LED and LCD Monitors.	20
UNIT-II	Elementary Drawing: Points and various line drawing Algorithms and their comparisons. Circle generating algorithms, Algorithms for ellipse, arc and spiral Two Dimensional Transformations: Basic Transformations, Scaling, Translation, Rotation, Reflection, Shear, Matrix representation of Basic transformations and homogenous coordinates.	10
UNIT-III	Composite Transformations: Windowing and clipping. Windowing concepts, clipping and its algorithms, Window-to-view port transformations, Area filling techniques, flood fill techniques.	10

UNIT-IV	Three Dimensional concepts: 3 D Coordinate Systems. 3 transformations. translation, scaling, rotation, projections, parallel projections. Perspective projection. Implementation in C: C programming for drawing 2 D objects –line rectangle, arc, circle and ellipse. C Programming for 2–D	10
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Recommended Books:

1. Computer Graphics by Donal Hearn M. Pardive Baker (PHI) Easter Economy Edition.
2. Computer Graphics by Roy A. Plastock and Gordon Kalley –Schaum’s Series.
3. Computer Graphics by Marc Berger.

Instruction of Question Paper setter

Paper setters have to follow the following pattern while setting up the question paper.

Maximum Marks will be 60.

There will be three parts in the question paper

1. Part 1 (Question 1) will consists of 12 multiple choice questions having one mark each.
2. Part 2 (Questions 2 to 7) will consists of 6 questions each having 4 marks. There will be choice in the even number questions i.e Q. No 2, 4 and 6
3. Part 3 (Questions 8 to 10) will consists of 3 questions each having 8 marks. There will be choice in the odd number question i.e Q. No 9.

Course Outcome:

- Understand the fundamentals of computer graphics and different display devices.
- Understand and Apply scan conversion algorithm for various graphics primitivessuch points, lines, circles etc.
- Apply basic 2D transformations such as translation, rotation and scaling.
- Implement different region filling, clipping and Viewing techniques.
- Apply 3D transformation and projection techniques.



SUBJECT TITLE:

Core Java SUBJECT CODE:

BCA3502 SEMESTER: V

CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
4	1	0	4.5

Internal Assessment: 40

End Term Exam: 60

Duration of Exam; 3 Hrs

Course Objectives:

- An introduction to core concepts of java language. Provides an understanding of the purpose and benefits of using java language for creating many small applications.
- Students will be able to create number of small applications in Java.
- Students will be able to understand the need of platform independence in today's environment and write programs for solutions to various real-life problems using the object oriented approach and JAVA language.

Contents of Syllabus:

Sr. No	Contents	Contact Hours
UNIT-I	<p>JAVA EVOLUTION :- Java History; Java Features (Compiled and interpreted, Platform independent and portable, Object-oriented, Robust and secure, Distributed, Simple, small and familiar, Multithreaded and interactive, High performance, Dynamic and extensible); How Java Differs from C and C++ (Java and C, Java and C++); Java and Internet, Java and World Wide Web, Web Browsers (Hot Java, Netscape Navigator, Internet Explorer); Hardware and Software Requirements; Java Support Systems, Java Environment (Java development kit, Java standard library).</p> <p>OVERVIEW OF JAVA LANGUAGE: - Introduction; Simple Java Program (Class declaration, Opening brace, The main line, The output line); More of Java (Use of math functions, Comments); An application with Two Classes; Java Program Structure (Documentation section, Package statement, Import statements, Interface statements, Class definitions, Main method class); Java Tokens (Java character set, Keywords, Identifiers, Literals, Operators, Separators); Java Statements; Implementing a Java Program (Creating the program, Compiling the program, Running the program, Machine neutral); Java Virtual Machine; Command Line Arguments; Programming Style.</p>	20

UNIT-II	<p>CONSTANTS, VARIABLES AND DATA TYPES :- Introduction; Constants (Integer constants, Real constants, Single character constants, String constants, Backlash character constants); Variables; Data Types (Integer types, Floating point type, Character type, Boolean type); Declaration of Variables; Giving Values to Variables (Assignment statement, Read statement); Scope of Variable; Symbolic Constants; Type Casting (Automatic conversion); Getting Values of Variables; Standard Default Values.</p> <p>OPERATORS AND EXPRESSIONS :- Introduction; Arithmetic Operators; Relational Operators; Logical Operators; Assignment Operators; Increment and Decrement Operators; Conditional Operators; Bit-wise Operators; Special Operators (instance of operator, Dot operator); Arithmetic Expressions; Evaluation of Expressions; Precedence of Arithmetic Operator; Type Conversions in Expressions; Operator Precedence and Associativity; Mathematical Functions.</p> <p>DECISION MAKING AND BRANCHING :- Decision Making with if Statement; Simple if Statement; The if....else Statement; Nesting of if....else Statements; The else if Ladder; The switch statement; The ?: Operator.</p> <p>LOOPING :- The while Statement; The do Statement; The for Statement (Additional features of for loop, Nesting of for loops); Jumps in Loops; Labelled Loops.</p>	12
UNIT-III	<p>CLASSES, OBJECTS AND METHODS :- Introduction; Defining a Class; Adding Variables; Adding Variables; Adding Methods; Creating Objects; Accessing Class Members; Constructors; Methods Overloading; Static Members; Nesting of Methods; Inheritance: Extending a Class (Defining a subclass, Subclass constructor, Multilevel inheritance, Hierarchical inheritance); Overriding Methods; Final Variables and Methods; Final Classes; Finalizer Methods; Abstract Methods and Classes; Visibility Control (public access, friendly access, protected access, private access, private protected access, Rules of Thumb).</p> <p>ARRAYS , STRINGS AND VECTORS :- Arrays; One-Dimensional Arrays; Creating an Array (Declaration of arrays, Creation of arrays, Initialization of arrays, Array length); Two-Dimensional Arrays (Variable size arrays); Strings (String arrays, String methods, StringBuffer class); Vectors; Wrapper Classes</p>	13
UNIT-IV	<p>INTERFACES: Introduction; Defining Interfaces; Extending Interfaces; Implementing Interfaces; Accessing Interface Variables.</p> <p>PACKAGES: Introduction; System Packages; Using System Packages; Naming Conventions; Creating Packages; Accessing a Package; Using a</p>	12

	<p>Package; Adding a Class to a Package; Hiding Classes.</p> <p>MANAGING ERRORS AND EXCEPTIONS Types of Errors (Compile-time error, Run-time error); Exceptions; Syntax of Exception Handling Code; Multiple Catch Statements; Using finally Statement; Throwing Our Own Exceptions; Using Exceptions for Debugging.</p> <p>APPLET PROGRAMMING :- Introduction; How Applets Differ from Applications; Preparing to Write Applets; Building Applet Code; Applet Life Cycle (Initialization state, Running State, Idle or stopped state, Dead state, Display state); Creating an Executable Applet; Designing a Web Page (Comment Section, Head Section, Body Section); Applet Tag; Adding Applet to HTML File; Running the Applet; More About Applet Tag; Passing Parameters to Applets; Aligning the Display; More about HTML Tags; Displaying Numerical Values; Getting Input from the User (Program analysis).</p>	
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Recommended Books:

1. “Java–The Complete Reference”, HurbertSchildt, Tata MacGraw Hill.
2. “Introduction to Java Programming”, Y. Daniel Mliang, Pearsons Publications.

Instruction of Question Paper setter

Paper setters have to follow the following pattern while setting up the question paper.

Maximum Marks will be 60.

There will be three parts in the question paper

1. Part 1 (Question 1) will consists of 12 multiple choice questions having one mark each.
2. Part 2 (Questions 2 to 7) will consists of 6 questions each having 4 marks. There will be choice in the even number questions i.e Q. No 2, 4 and 6
3. Part 3 (Questions 8 to 10) will consists of 3 questions each having 8 marks. There will be choice in the odd number question i.e Q. No 9.

Course Outcome:

- Understand the basics of java programming and various object-oriented features.
- To understand the classes, objects and methods, constructors.
- Develop reusable programs using the concepts of inheritance, interfaces and packages.
- Apply the concepts of Exception handling to develop efficient and error free codes.
- Ability to understand the different concepts of applets and adding them to a HTML File.



SUBJECT TITLE: Data Warehouse and

Mining SUBJECT CODE: BCA3504

SEMESTER: V

CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
4	1	0	4.5

Internal Assessment: 40

End Term Exam: 60

Duration of Exam; 3 Hrs

Course Objective:

- To Learn to understand the basics functionality of Datawarehouse and mining components.
- Learn the different methodologies used in Datawarehouse and Mining.
- To learn the different analyzing techniques of various data.

Contents of Syllabus:

Sr. No	Contents	Contact Hours
UNIT-I	Introduction to Data Warehousing, The need for data warehousing, Operational & Informational Data Stores, Data Ware house Characteristics, Data Warehouse role & Structure, The cost of warehousing data. Introduction to OLAP &OLTP, Difference between OLAP & OLTP. OLAP Operations.	20
UNIT-II	Building a Data Warehouse, Design/Technical/Implementation Considerations, Data Pre-processing Overview. Data Summarization, Data Cleaning, Data Transformation, Concept Hierarchy, Structure. Patterns & Models, Artificial Intelligence (Overview).Multidimensional Data Model, Schemas for Multidimensional Data (Star Schema, Snowflake Schema, Fact Constellation), Data Warehouse Architecture, Data Warehouse Design, OLAP ,Three-tier Architecture, Indexing & Querying in OLAP, OLAM, Efficient Methods of Cube Computation, Discovery Driven Exploration of Data Cubes, Attributed-Oriented Induction.	15
UNIT-III	Association Rule Mining, Market Basket Analysis, Apriori Algorithm, Mining Multilevel Association Rules, From Association Mining to Correlation Analysis, Constraint Based Association Mining, Introduction to Classification, Classification by decision Tree, Attribute Selection Measure.	10

UNIT-IV	Introduction to Prediction techniques, Accuracy of a Classifier, Cross-	10
	Validation, Bootstrap, Boosting, Bagging, Introduction to Clustering, Classification of Various Clustering Algorithms, Selecting and Using Right DM Technique, Selecting and Using Right DM Technique, Data Visualization.	

Recommended Books:

1. Data Warehousing, Data Mining, and OLAP, Alex Berson, First Edition, Tata McGraw Hill
2. Data Mining Concepts & Techniques, Jiawei Han & Micheline Kamber, Second Edition, Morgan Kaufmann Publishers
3. Modern Data Warehousing, Mining & Visualization Core Concepts, George M Marakas, First Edition, Pearson Education
4. Data Warehousing, Architecture & Implementation, Hawkin, Prentice Hall
5. Data Mining: Modelling Data for Marketing, Risk and Customer Relationship Mgmt, Rud,Olivia, Paperback Edition
6. Data Mining Techniques, Berry,Michael, Third Edition
7. Data Mining, Data Warehousing and OLAP, Sharma, Gajendra, Second Edition

Instruction of Question Paper setter

Paper setters have to follow the following pattern while setting up the question paper.

Maximum Marks will be 60.

There will be three parts in the question paper

1. Part 1 (Question 1) will consists of 12 multiple choice questions having one mark each.
2. Part 2 (Questions 2 to 7) will consists of 6 questions each having 4 marks. There will be choice in the even number questions i.e Q. No 2, 4 and 6
3. Part 3 (Questions 8 to 10) will consists of 3 questions each having 8 marks. There will be choice in the odd number question i.e Q. No 9.

Course Outcome:

- Understand the functionality of the various data warehousing component.
- Appreciate the strengths and limitations of various data mining and data warehousing models.
- Explain the analyzing techniques of various data.
- Describe different methodologies used in data mining and data ware housing.
- Compare different approaches of data ware housing and data mining with various technologies.



SUBJECT TITLE: S/W Lab -IX

(Computer Graphics) SUBJECT CODE: BCA3505

SEMESTER: V

CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
0	0	4	2

Internal Assessment: 40

End Term Exam: 60

Duration of Exam; 3 Hrs

Course Objective:

- We will look at raster scan graphics including line and circle drawing, polygon filling, anti-aliasing algorithms
- Clipping, hidden-line and hidden surface algorithms including ray tracing and, of course, rendering
- Implementation of basic and advanced algorithms will be done in C/ C++.

Contents of Syllabus:

Sr. No	Contents	Contact Hours
UNIT-I	<ol style="list-style-type: none">1. Use of basic functions of graphic available in C++ like circle, putpixel, rectangle, arc, ellipse, floodfill, setcolor etc.2. Use of basic primitive functions to show some animations.3. Line Drawing Algorithm like Direct method, DDA and Bresenham's line algorithms.4. Draw a circle using polynomial, trigonometry method and Bresenham's Algorithm.5. Draw an ellipse using Bresenham's Algorithm.6. To move a character along circle.7. To show 2D Clipping and Windowing.	20

Course Outcome:

- Design Program using basic computer graphics commands.
- Apply direct algorithm to implement line drawing.
- Apply polynomial method to implement circle drawing.
- Apply the scan conversion algorithm for various graphics primitives.
- Implement 2D transformation and clipping techniques.



SUBJECT TITLE: S/W Lab -X

(Core Java) SUBJECT CODE: BCA3506

SEMESTER: V

CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
0	0	4	2

Internal Assessment: 40

End Term Exam: 60

Duration of Exam; 3 Hrs

Course Objectives:

- To write object oriented based java programs using the concepts of classes and Objects.
- The student will be able to write the programs to implement the concept of Inheritance and polymorphism.
- The student can able to write the Applet programs to embed the Java in web pages.

Contents of Syllabus:

Sr. No	Contents	Contact Hours
	This laboratory course will comprise as exercises to supplement what is learnt under paper BCA 3506: Core Java.	

Course Outcome:

- Able to develop the basic java programs based on class, objects and methods.
- Able to write programs based on Arrays, Abstraction, static keyword.
- Able to write programs based on Inheritance, Final keyword, Interface, Packages.
- Able to develop programs based on exception handling.
- Able to develop the Applets programs and adding them to HTML file



SUBJECT TITLE: S/W Lab -XI (Major)

Project - I) SUBJECT CODE: BCA3507

SEMESTER: V

CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
0	0	6	3

Internal Assessment: 40

End Term Exam: 60

Duration of Exam; 3 Hrs

Course Objective :

- Applying techniques for producing application software solutions for real world problems.
- Implementing estimation, design, testing and quality maintenance.
- Learning to work within deadlines.

Contents of Syllabus:

Sr. No	Contents	Contact Hours
	<p>Tools for Minor Projects</p> <p>Frontend VB or .NET (Either VB .Net or ASP .Net) or Java</p> <p>Backend Sql Server or Oracle</p> <p>In Minor Projects 2 normal applications and one database related application is must.</p> <p>The module shall be developed in groups, consisting of at most three students in a group.</p>	

Course Outcome:

- Analyze the problem, formulation and solution of the selected project.
- Develop solutions for contemporary problems using modern tools for sustainable development.
- Understanding the concept of feasibility study and deadlines
- Making use of different design tools for problem solving.
- Understanding importance of Cost estimation, quality management and maintenance of product.



Program Name: Bachelor of Computer Applications
Program Code: CA301

SECTION 6

Detailed Syllabus with Course Outcomes

SYLLABUS SEMESTER-6



SUBJECT TITLE: Advanced Java

SUBJECT CODE: BCA3601

SEMESTER: VI

CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
4	1	0	4.5

Internal Assessment: 40

End Term Exam: 60

Duration of Exam; 3 Hrs

Course Objectives:

- To let students, understand advanced features of java programming language,
- To create GUI based applications using AWT and event driven.
- The students will able to create secure and fast java applications connected with database.

Contents of Syllabus:

Sr. No	Contents	Contact Hours
UNIT-I	JAVA AWT: java AWT package Containers (Component, Container, Panel, Window, Frame, Canvas), Basic User Interface components (Labels, Buttons, Check Boxes, Radio Buttons, Choice, Text Fields, Text Areas, Scrollbars), Layouts (Flow Layout, Grid Layout, Border Layout, Card Layout). EVENT HANDLING: Event delegation Approach, ActionListener, AdjustmentListener, MouseListener and MouseMotionListener, WindowListener, KeyListener JAVA I/O HANDLING : I/O File Handling(InputStream&OutputStreams, FileInputStream&FileOutputStream, Data I/P and O/P Streams, Buffered I/P and O/P Streams, File Class, Reader and Writer Streams, Random Access File).	20

UNIT-II	<p>MULTITHREADING: Overview of Multithreading, The Thread control methods, Thread life cycle, newly created threads, Main thread, creating a Thread (Implementing Runnable Interface, Extending the Thread Class), Thread Synchronization, Writing Applets with Threads.</p> <p>SOCKET PROGRAMMING: Introduction, TCP/IP Protocol, UDP Protocol, Ports, Using TCP/IP Sockets, Using UDP Sockets</p>	10
UNIT-III	<p>JAVA DATABASE CONNECTIVITY (JDBC): JDBC/ODBC Bridge, DriverManager Class, Java.SQL Package (Connection Interface, Statement Interface, Prepared Statement Interface, ResultSet Interface,</p>	15
	<p>ResultSetMetaData Interface), SQL Exception class.</p> <p>REMOTE METHOD INVOCATION: N-tier Architecture, Distributed object technologies, Locating & loading Remote classes, Locating remote objects & providing references to them, Enabling remote method class, RMI Architecture(Application Layer, Proxy Layer, Remote Reference Layer, Transport Layer), Naming, Remote Interface, Unicast Remote Object, Socket Vs RMI programming</p>	
UNIT-IV	<p>JAVA SERVLETS: Introduction to Server Side Technologies, Servlet Life cycle, HttpServlets, GenericServlets, init(),service(), doGet(), doPost(), destroy() , Servlets & JDBC.</p>	5

Recommended Books:

1. Programming In Java, E-Balagurusami, Fourth Edition, Tata McGraw Hill
2. Mastering Java, Second Edition, BPB Publications
3. Advance Java, Ivan Bayross, BPB Publications

Instruction of Question Paper setter

Paper setters have to follow the following pattern while setting up the question paper.

Maximum Marks will be 60.

There will be three parts in the question paper

1. Part 1 (Question 1) will consists of 12 multiple choice questions having one mark each.
2. Part 2 (Questions 2 to 7) will consists of 6 questions each having 4 marks. There will be choice in the even number questions i.e Q. No 2, 4 and 6
3. Part 3 (Questions 8 to 10) will consists of 3 questions each having 8 marks. There will be choice in the odd number question i.e Q. No 9.

Course Outcome:

- Understand the creation of GUI based applications with AWT and Event handling.



- Gain insights of concept of Multithreading in java programming.
 - Understand the basics of Socket Programming using TCP/IP Sockets.
 - Understand and Analyze the connectivity of java language with database.
 - Analyze and understand the communication with Client and Server with RMI and basics of Servlets.



SUBJECT TITLE: System

Software SUBJECT CODE: BCA3602

SEMESTER: VI

CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
4	1	0	4.5

Internal Assessment: 40

End Term Exam: 60

Duration of Exam; 3 Hrs

Course Objectives:

- Distinguish between Operating Systems software and Application Systems software.
- To discuss Assembler, Compiler and code optimization techniques
- To discuss the linker and loader working and their principles.

Contents of Syllabus:

Sr. No	Contents	Contact Hours
UNIT-I	Introduction: Definition of system software, types of system software, Introduction to Translators, loaders, interpreters, compiler, and assemblers. Language Processors: Introduction, Fundamentals of Language Processing.	13
UNIT-II	Assemblers: Overview of assembly process, design of two pass assembler Macroprocessors: Macro definition and expansion, macro parameters, Design of macro pre-processor	12
UNIT-III	Introduction: Application and system software, operating system concepts, functions of operating systems, types of operating systems, Process scheduling, Process states, PCB, schedulers.	12
UNIT-IV	Memory Management: Introduction, swapping, contiguous memory allocation, paging, Segmentation.	13

Recommended Books:

1. D.M. Dhamdhere: Introduction to System Software, Tata McGraw Hill.
2. D.M. Dhamdhere: System Software and Operating System, Tata McGraw Hill, 1992.
3. Ullman and Aho: Compiler Design

4. Donovan, "System programming". (McGraw-Hill), 1991

Instruction of Question Paper setter

Paper setters have to follow the following pattern while setting up the question paper.

Maximum Marks will be 60.

There will be three parts in the question paper

1. Part 1 (Question 1) will consists of 12 multiple choice questions having one mark each.
2. Part 2 (Questions 2 to 7) will consists of 6 questions each having 4 marks. There will be choice in the even number questions i.e Q. No 2, 4 and 6
3. Part 3 (Questions 8 to 10) will consists of 3 questions each having 8 marks. There will be choice in the odd number question i.e Q. No 9.

Course Outcome:

- Understand system software and machine architecture.
- will be learn about assemblers and its design passes.
- Understand and design macro processor and its advanced facilities.
- Learn about compiler phases and code optimization.
- Understand the working principles of linkers and loaders.



SUBJECT TITLE: Handling Operating

System SUBJECT CODE: BCA3603

SEMESTER: VI

CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
4	1	0	4.5

Internal Assessment: 40

End Term Exam: 60

Duration of Exam; 3 Hrs

Course Objectives: After completing requirements for this course, the student will be able to:

- Describe the principal features of Windows 2000 and the basics of networking with Windows 2000.
- Describe the types of user accounts and the principal security features of a Windows 2000 network
- Describe the client and server technologies used in accessing Web services.

Contents of Syllabus:

Sr. No	Contents	Contact Hours
UNIT-I	<p>Evaluating Windows 2000 Professional : Understating the Windows 2000 Family, windows 2000 Professional, Windows 2000 Server, Windows 2000 Advanced Server, Windows 2000 Data Center, Comparing Windows 2000 Professional with Other Windows Operating Systems, Windows 2000 Professional versus Windows 3.1, Windows 2000 Professional versus Windows 95/98, Windows 2000 Professional versus Windows NT Workstation 4, Networking and Windows 2000 Professional</p> <p>Installing and Upgrading to Windows 2000 Professional : Windows 2000 Professional Hardware Requirements, Checking Your Hardware Compatibility, Collecting Network Information, Making a Backup, Should You Upgrade or make a New Installation ?, Running Setup, Performing a New Installation, Upgrading to Windows 2000 Professional, Choosing a File System, NTFS, FAT and FAT32, A Quick Look at Disk Partitions, Setting up a Dual-Boot Configuration, Installing the Add-on Components, Creating a New User Account.</p>	20

UNIT-II	<p>Setting Object Properties : Right-Clicking in Windows 2000 Professional, Using Properties Dialog Boxes, Changing File Properties, Compressing and Encrypting Files with NTFS, Changing Folder Properties, My Computer Properties Setting</p> <p>Installing and Running Your Applications : Running Programs from the Start Menu, Running Programs from Explorer, Running Programs from Search, Running Programs from a Document, Starting Programs Automatically When you Start, Windows 2000 Professional, Running Programs Minimized, Using the Run Command, Working from the Command Prompt, Adding and Removing Programs, Adding New Programs, Changing or Removing Programs, Adding and Removing Windows Components, Looking at the Registry, Scheduling Tasks, Adding a New Scheduled Task, Modifying an Existing Scheduled Task, Using the Advanced Menu</p>	15
UNIT-III	<p>Printers and Printing: Adding Printers, Installing a Local Printer, Installing a Network Printer, Printing Documents, Printing form the Desktop, Printing from an Application, Printing to a File, Managing the Printing Process, Customizing the Printer's Properties, The General Tab, The General Tab, The Ports Tab, The Advanced Tab, The Services Tab, The Device Settings Tab, The Security Tab, The Color Management Tab, Understanding Fonts.</p> <p>Windows 2000 with ADS: How Networks Develop, The General Goals of ADS, Enterprise Management, An Industry Standard, Vendor Acceptance, User Acceptance, Single Namespace, Namespace, Active Directory Names, Active Directory in the Windows 2000 Server Architecture, The Security Subsystem, The Directory Service Module, The Internal Architecture of the Active Directory Module.</p>	10

UNIT-IV	<p>Creating and Managing User Accounts: Use Computer Management for Local Accounts, Use Active Directory User And Computers for Domain Accounts, Where Do User and Group Accounts Live ?, Security Identifiers, Quick Tour of User and Group-Related Functions in Active Directory Users and Computers, Prebuilt Accounts: Administrator and Guest, Creating a New User Account, User Account Properties, Managing Accounts, Understanding Groups, Creating Groups, Group Types: Security Groups versus Distribution Groups, Group Scope: Locals, Globals and Universals,</p> <p>Working with Security Groups, User Rights, How do Organizational Units Fit in Here?</p> <p>Working with Group Policies, Group Policy Concepts, Local Policies and Group Policy Objects, Creating Group Policies, Filtering Group Policy, Delegating Group Policy Administration, User and Computer</p>	15
	Configuration Settings, Managing Group Policies.	

Recommended Books:

Complete Reference: Windows 2000 Server

Complete Reference: Windows 2000 Professional

Instruction of Question Paper setter

Paper setters have to follow the following pattern while setting up the question paper.

Maximum Marks will be 60.

There will be three parts in the question paper

1. Part 1 (Question 1) will consists of 12 multiple choice questions having one mark each.
2. Part 2 (Questions 2 to 7) will consists of 6 questions each having 4 marks. There will be choice in the even number questions i.e Q. No 2, 4 and 6
3. Part 3 (Questions 8 to 10) will consists of 3 questions each having 8 marks. There will be choice in the odd number question i.e Q. No 9.

Course Outcome:

- Understand the evaluation of windows server 2000 and other windows working and installation processes.
- Understand the functionalities of windows server 2000 and its features.
- Understand the windows server 2000 Active Directory Services.



- Understand the windows server 2000 Security issues and its updates.
- Understand the windows server 2000 accounts management system.



SUBJECT TITLE: Principles of

Management SUBJECT CODE: BCA3604

SEMESTER: VI

CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
4	1	0	4.5

Internal Assessment: 40

End Term Exam: 60

Duration of Exam; 3 Hrs

Course Objectives: After completing requirements for this course, the student will be able to:

- To help the students gain understanding of the functions and responsibilities of managers
- To enable them to analyze and understand the environment of the organization.
- To help the students to develop cognizance of the importance of management principles.

Contents of Syllabus:

Sr. No	Contents	Contact Hours
UNIT-I	<p>NATURE AND FUNCTIONS OF MANAGEMENT : Importance of management; Definition of management; Management functions or the process of management; Management Process; Roles of a Manager; Levels of management; Managerial Skills; Management and administration; Management-a science or an art?; Management-a profession?; Professional management vs .family management.</p> <p>DEVELOPMENT OF MANAGEMENT THOUGHT: Early Management Approaches; Modern Management Approaches.</p> <p>COORDINATION : Distinction between coordination and cooperation; Need for coordination; Requisites for excellent coordination; Types of coordination; Techniques of coordination; Difficulty of coordination; Systems approach and coordination.</p>	15
UNIT-II	<p>PLANNING: Nature of planning; Importance of Planning; Forms of Planning; Types of plans; Steps in Planning; Limitations of Planning; Making Planning Effective; Strategic Planning in Indian Industry.</p> <p>DECISION-MAKING : Meaning of a Decision; Types of decisions; Steps in rational, decision making; Rationality in decision-making; Environment of decision-making; Common difficulties in decision-making.</p> <p>Organisation: Meaning; Why study organization?; Process of Organising;</p>	10

	<p>Span of management; Principles of organizing; Departmentalisation; Organisation structure; Why type of structure is best?; Committees.</p> <p>AUTHORITY DELEGATION & DECENTRALIZATION: Sources of formal authority, difference between authority & power, uses of authority, Responsibility, Line & Staff authority, Decentralization of authority.</p>	
UNIT-III	<p>STAFFING : Importance and need for proper staffing; Manpower planning; Recruitment; Selection; Placement and orientation; Recruitment and selection practices in India.</p> <p>DIRECTION : Requirements of effective direction, Giving orders, Motivation, Job Satisfaction, Morale.</p> <p>COMMUNICATION : Importance of Communication, Purposes of Communication, Formal Communication, Forms of Communication, Informal Communication, the communication process, Barriers to communication, Principles of effective communication.</p>	15
UNIT-IV	<p>LEADERSHIP: Differences between a Leader& a Manager, Characteristics of Leadership, functions of a leader, Functions of a leader, Approaches to leadership, Effective leadership, Conditions of effective leadership, Leadership assessment, Leadership style in Indian Organization.</p> <p>MANAGERIAL CONTROL: Steps in a control process; Need for control; Types of control methods; Essentials of effective control systems; Problems in the control process; Control techniques.</p>	10

Recommended Books:

1. Essentials of Management, Koontz, Tenth Edition
2. Principles & Practices of Management, L.M.Prasad, Third edition
3. Management, Y. K. Bhushan, Fourth Edition
4. An Executive's Encyclopedia of Management Practices, Prof. Parag Diwan

Instruction of Question Paper setter

Paper setters have to follow the following pattern while setting up the question paper.

Maximum Marks will be 60.

There will be three parts in the question paper

1. Part 1 (Question 1) will consists of 12 multiple choice questions having one mark each.



2. Part 2 (Questions 2 to 7) will consists of 6 questions each having 4 marks. There will be choice in the even number questions i.e Q. No 2, 4 and 6
3. Part 3 (Questions 8 to 10) will consists of 3 questions each having 8 marks. There will be choice in the odd number question i.e Q. No 9.

Course Outcome:

- Understand the concepts of management, administration and the evolution of management thoughts.
- Understand and apply the planning concepts.
- Analyze the different organizational structures and understand the staffing process.
- Analyze the various motivational and leadership theories and understand the communication and controlling processes.
- Understand and apply the Controlling concepts.

SUBJECT TITLE: S/W Lab - XII (Advanced Java)

SUBJECT CODE: BCA3605

SEMESTER: VI

CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
0	0	4	2

Internal Assessment: 40

End Term Exam: 60

Duration of Exam; 3 Hrs

Course Objectives:

- To create GUI based programs using AWT and Event handling
- Able to create data applications connected with database.
- To create multithreading based programs.

Contents of Syllabus:

Sr. No	Contents	Contact Hours
UNIT-I	<ol style="list-style-type: none">1. Operators and Mathematical Functions.2. Decision making, Branching and Looping Statements.3. Classes, Objects and Methods.4. Arrays, Strings and Vectors.5. Interfaces.	



	<ol style="list-style-type: none">6. Packages.7. Exception handling.8. Applet Programming.9. AWT.10. Event Handling.11. I/O Handling.	
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Course Outcome:

- Create the GUI based Programs using AWT and Event Handling concepts.
- Implement the concept of multithreading with Java programming.
- Demonstrate the use of java database connectivity.
- Creating the programs based on TCP/IP Sockets.
- Implement the concept of RMI and Servlets for creating distributed applications.



SUBJECT TITLE: S/W Lab -XIII (Handling Operating

System) SUBJECT CODE: BCA3606

SEMESTER: VI

CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
0	0	4	2

Internal Assessment: 40

End Term Exam: 60

Duration of Exam; 3 Hrs

Course Objectives:

- To Install and configuring Windows 2000 server.
- Centrally manage Active Directory Users and components.
- Trouble shoot Windows Server issues.

Contents of Syllabus:

Sr. No	Contents	Contact Hours
UNIT-I	Practical implementation and installation of concepts studied in paper BCA 3606: Handling Operating Systems.	

Course Outcome:

- Learn basic Hardware requirements to install windows 2000 server.
- Understand File systems and perform complete installation process of windows 2000 server.
- Study & perform Windows properties and customize features to add and remove programs.
- Learn and complete the process to install Printer device and also done ADS services.
- understand and create and manage user accounts according to organizational environment.



SUBJECT TITLE: S/W Lab -XIV (Major

Project - II) SUBJECT CODE: BCA3607

SEMESTER: VI

CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
0	0	6	3

Internal Assessment: 40

End Term Exam: 60

Duration of Exam; 3 Hrs

Course Objective:

1. To learn the technical knowledge of their selected project topic.
2. To understand problem identification, formulation and solution.
3. To learn how to communicate in written and oral forms.

Contents of Syllabus:

Sr. No	Contents	Contact Hours
UNIT-I	Tools for Major Project - II Frontend VB or .NET (Either VB .Net or ASP .Net) or Java Reports Crystal Reports Backend Sql Server or Oracle	

Course Outcome:

- Identify the various technologies and fields like VB or .NET (Either VB .Net or ASP .Net) or Java , oracle for the Project.
- Analyze the problem identification, performance parameters, formulation and solution of the selected Project.
- Design the solutions to complex problems utilizing a systems approach.
- Integrate information from multiple sources to develop a web applications and web services.
- Conduct project with presentation and report in written and oral form.