DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS
KURUKSHETRA UNIVERSITY, KURUKSHETRA

<table>
<tr><td colspan="4">Session: 2023-24</td></tr>
<tr><td colspan="4">Part A - Introduction</td></tr>
<tr><td>Subject</td><td colspan="3">BCA</td></tr>
<tr><td>Semester</td><td colspan="3">I</td></tr>
<tr><td>Name of the Course</td><td colspan="3">Problem Solving through C</td></tr>
<tr><td>Course Code</td><td colspan="3">B23-CAP-101 (Common with B23-CAI-101, B23-CDS-101, B23-CTS-101)</td></tr>
<tr><td>Course Type: (CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/ VAC)</td><td colspan="3">CC</td></tr>
<tr><td>Level of the course (As per Annexure-I</td><td colspan="3">100-199</td></tr>
<tr><td>Pre-requisite for the course (if any)</td><td colspan="3"></td></tr>
<tr><td>Course Learning Outcomes(CLO):</td><td colspan="3">After completing this course, the learner will be able to:
1. learn the basics of C program, data types and input/output statements.
2. understand different types of operators, their hierarchies and also control statements of C.
3. implement programs using arrays and strings.
4. get familiar with advanced concepts like structures, union etc. in C language.
5*. to implement the programs based on various concepts of C.</td></tr>
<tr><td rowspan="2">Credits</td><td>Theory</td><td>Practical</td><td>Total</td></tr>
<tr><td>3</td><td>1</td><td>4</td></tr>
<tr><td>Contact Hours</td><td>3</td><td>2</td><td>5</td></tr>
<tr><td colspan="2">Max. Marks:100(70(T)+30(P))
Internal Assessment Marks:30(20(T)+10(P))
End Term Exam Marks: 70(50(T)+20(P))</td><td colspan="2">Time: 3 Hrs.(T), 3Hrs.(P)</td></tr>
<tr><td colspan="4">Part B- Contents of the Course</td></tr>
<tr><td colspan="4"><u>Instructions for Paper- Setter</u>
Examiner will set a total of nine questions. Out of which first question will be compulsory. Remaining eight questions will be set from four unit selecting two questions from each unit. Examination will be of three-hour duration. All questions will carry equal marks. First question will comprise of short answer type questions covering entire syllabus.
Candidate will have to attempt five questions in all, selecting one question from each unit. First</td></tr>
</table>

question will be compulsory.
Practicum will be evaluated by an external and an internal examiner. Examination will be of three-hour duration.

Unit	Topics	Contact Hours
I	Overview of C: History, Importance, Structure of C Program, Character Set, Constants and Variables, Identifiers and Keywords, Data Types, Assignment Statement, Symbolic Constant. Input/output: Formatted I/O Function-, Input Functions viz. scanf(), getch(), getche(), getchar(), gets(), output functions viz. printf(), putch(), putchar(), puts().	10
II	Operators & Expression: Arithmetic, Relational, Logical, Bitwise, Unary, Assignment, Conditional Operators and Special Operators Operator Hierarchy; Arithmetic Expressions, Evaluation of Arithmetic Expression, Type Casting and Conversion. Decision making with if statement, if-else statement, nested if statement, else-if ladder, switch and break statement, goto statement, Looping Statements: for, while, and do-while loop, jumps in loops.	10
III	Arrays: One Dimensional arrays - Declaration, Initialization and Memory representation; Two Dimensional arrays -Declaration, Initialization and Memory representation. Functions: definition, prototype, function call, passing arguments to a function: call by value; call by reference, recursive functions. Strings: Declaration and Initialization, String I/O, Array of Strings, String Manipulation Functions: String Length, Copy, Compare, Concatenate etc., Search for a Substring.	10
IV	Pointers in C: Declaring and initializing pointers, accessing address and value of variables using pointers; Pointers and Arrays. User defined data types: Structures - Definition, Advantages of Structure, declaring structure variables, accessing structure members, Structure members initialization, Array of Structures; Unions - Union definition; difference between Structure and Union.	10
V*	Practicum: Students are advised to do laboratory/practical practice not limited to, but including the following types of problems: • To read radius of a circle and to find area and circumference • To read three numbers and find the biggest of three • To check whether the number is prime or not • To read a number, find the sum of the digits, reverse the number and check it for palindrome • To read numbers from keyboard continuously till the user presses 999 and to find the sum of only positive numbers • To read percentage of marks and to display appropriate message (Demonstration of else-if ladder) • To find the roots of quadratic equation • To read marks scored by n students and find the average of	25

	marks (Demonstration of single dimensional array) • To remove Duplicate Element in a single dimensional Array • To perform addition and subtraction of Matrices • To find factorial of a number • To generate Fibonacci series • To remove Duplicate Element in a single dimensional Array • To find the length of a string without using built in function • To demonstrate string functions • To read, display and add two m x n matrices using functions • To read a string and to find the number of alphabets, digits, vowels, consonants, spaces and special characters • To Swap Two Numbers using Pointers • To demonstrate student structure to read & display records of n students • To demonstrate the difference between structure & union.	
Suggested Evaluation Methods		
Internal Assessment: ➢ **Theory** • Class Participation: 5 • Seminar/presentation/assignment/quiz/class test etc.: 5 • Mid-Term Exam: 10 ➢ **Practicum** • Class Participation: 5 • Seminar/Demonstration/Viva-voce/Lab records etc.: 5 • Mid-Term Exam: NA		**End Term Examination:** A three hour exam for both theory and practicum.
Part C-Learning Resources		
Recommended Books/e-resources/LMS: • Gottfried, Byron S., Programming with C, Tata McGraw Hill. • Balagurusamy, E., Programming in ANSI C, Tata McGraw-Hill. • Jeri R. Hanly & Elliot P. Koffman, Problem Solving and Program Design in C, Addison Wesley. • Yashwant Kanetker, Let us C, BPB. • Rajaraman, V., Computer Programming in C, PHI. • Yashwant Kanetker, Working with C, BPB.		

*Applicable for courses having practical component.

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<tr><td>Subject</td><td colspan="3">BCA</td></tr>
<tr><td>Semester</td><td colspan="3">I</td></tr>
<tr><td>Name of the Course</td><td colspan="3">Foundations of Computer Science</td></tr>
<tr><td>Course Code</td><td colspan="3">B23-CAP-102 (Common with B23-CAI-101, B23-CDS-101, B23-CTS-101)</td></tr>
<tr><td>Course Type: (CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/ VAC)</td><td colspan="3">CC</td></tr>
<tr><td>Level of the course (As per Annexure-I</td><td colspan="3">100-199</td></tr>
<tr><td>Pre-requisite for the course (if any)</td><td colspan="3"></td></tr>
<tr><td>Course Learning Outcomes(CLO):</td><td colspan="3">After completing this course, the learner will be able to:
1. understand the basics of computer
2. learn about I/O devices and operating systems
3. understand internet and its services
4. learn about the threats and security concepts on computers
5*. to understand the working of operating system, internet and security related concepts.</td></tr>
<tr><td rowspan="2">Credits</td><td>Theory</td><td>Practical</td><td>Total</td></tr>
<tr><td>3</td><td>1</td><td>4</td></tr>
<tr><td>Contact Hours</td><td>3</td><td>2</td><td>5</td></tr>
<tr><td colspan="2">Max. Marks:100(70(T)+30(P))
Internal Assessment Marks:30(20(T)+10(P))
End Term Exam Marks: 70(50(T)+20(P))</td><td colspan="2">Time: 3 Hrs.(T), 3Hrs.(P)</td></tr>
<tr><td colspan="4">Part B- Contents of the Course</td></tr>
<tr><td colspan="4"><u>Instructions for Paper- Setter</u>
Examiner will set a total of nine questions. Out of which first question will be compulsory. Remaining eight questions will be set from four unit selecting two questions from each unit. Examination will be of three-hour duration. All questions will carry equal marks. First question will comprise of short answer type questions covering entire syllabus.
Candidate will have to attempt five questions in all, selecting one question from each unit. First question will be compulsory.
Practicum will be evaluated by an external and an internal examiner. Examination will be of</td></tr>
</table>

three-hour duration.		
Unit	**Topics**	**Contact Hours**
I	Computer Fundamentals: Evolution of Computers through generations, Characteristics of Computers, Strengths and Limitations of Computers, Classification of Computers, Functional Components of a Computer System, Applications of computers in Various Fields. Types of Software: System software, Application software, Utility Software, Shareware, Freeware, Firmware, Free Software. Memory Systems: Concept of bit, byte, word, nibble, storage locations and addresses, measuring units of storage capacity, access time, concept of memory hierarchy. Primary Memory - RAM, ROM, PROM, EPROM. Secondary Memory - Types of storage devices, Magnetic Tape, Hard Disk, Optical Disk, Flash Memory.	10
II	I/O Devices: I/O Ports of a Desk Top Computer, Device Controller, Device Driver. Input Devices: classification and use, keyboard, pointing devices - mouse, touch pad and track ball, joystick, magnetic stripes, scanner, digital camera, and microphone Output Devices: speaker, monitor, printers: classification, laser, ink jet, dot-matrix. Plotter. Introduction to Operating System**:** Definition, Functions, Features of Operating System, Icon, Folder, File, Start Button, Task Bar, Status Buttons, Folders, Shortcuts, Recycle Bin, Desktop, My Computer, My Documents, Windows Explorer, Control Panel.	10
III	The Internet: Introduction to networks and internet, history, Internet, Intranet & Extranet, Working of Internet, Modes of Connecting to Internet. Electronic Mail: Introduction, advantages and disadvantages, User Ids, Passwords, e-mail addresses, message components, message composition, mailer features. Browsers and search engines.	10
IV	Threats: Physical & non-physical threats, Virus, Worm, Trojan, Spyware, Keylogers, Rootkits, Adware, Cookies, Phishing, Hacking, Cracking. Computer Security Fundamentals: Confidentiality, Integrity, Authentication, Non-Repudiation, Security Mechanisms, Security Awareness, Security Policy, anti-virus software & Firewalls, backup & recovery.	10
V*	Practicum: Students are advised to do laboratory/practical practice not limited to, but including the following types of problems: Operating System: • Starting with basics of Operating Systems and its functionalities Computer Basics: • Identify the various computer hardware • Understanding the working of computer • Understanding various types of software	25

	Internet and E-mail: • Using Internet for various tasks • Creating and using e-mail. Security: • Understanding various threats • How to be safe from virus threats • Various software to get safe from virus attacks.	
Suggested Evaluation Methods		
Internal Assessment: ➢ **Theory** • Class Participation: 5 • Seminar/presentation/assignment/quiz/class test etc.: 5 • Mid-Term Exam: 10 ➢ **Practicum** • Class Participation: 5 • Seminar/Demonstration/Viva-voce/Lab records etc.: 5 • Mid-Term Exam: NA		**End Term Examination:** A three hour exam for both theory and practicum.
Part C-Learning Resources		
Recommended Books/e-resources/LMS: • Sinha, P.K. & Sinha, Priti, Computer Fundamentals, BPB. • Dromey, R.G., How to Solve it By Computer, PHI. • Norton, Peter, Introduction to Computer, McGraw-Hill. • Leon, Alexis & Leon, Mathews, Introduction to Computers, Leon Tech World. • Rajaraman, V., Fundamentals of Computers, PHI.		

*Applicable for courses having practical component.

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<tr><td>Subject</td><td colspan="3">BCA</td></tr>
<tr><td>Semester</td><td colspan="3">I</td></tr>
<tr><td>Name of the Course</td><td colspan="3">Logical Organization of Computer</td></tr>
<tr><td>Course Code</td><td colspan="3">B23-CAP-103 (Common with B23-CAI-101, B23-CDS-101, B23-CTS-101)</td></tr>
<tr><td>Course Type: (CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/ VAC)</td><td colspan="3">CC</td></tr>
<tr><td>Level of the course (As per Annexure-I</td><td colspan="3">100-199</td></tr>
<tr><td>Pre-requisite for the course (if any)</td><td colspan="3">Basic Knowledge of Mathematics (10th Level)</td></tr>
<tr><td>Course Learning Outcomes(CLO):</td><td colspan="3">After completing this course, the learner will be able to:
1. understand number systems, error detecting correcting code and representations of numbers in a computer system.
2. understand computer arithmetic and Boolean algebra and simplification of Boolean expressions.
3. understand working of logic gates and design various combinational circuits using these logic gates.
4. understand working of different types of flip-flops and design different types of registers.
5*. to understand the practical aspects of logical organization of computer.</td></tr>
<tr><td rowspan="2">Credits</td><td>Theory</td><td>Practical</td><td>Total</td></tr>
<tr><td>3</td><td>1</td><td>4</td></tr>
<tr><td>Contact Hours</td><td>3</td><td>2</td><td>5</td></tr>
<tr><td colspan="2">Max. Marks:100(70(T)+30(P))
Internal Assessment Marks:30(20(T)+10(P))
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<tr><td colspan="4"><u>Instructions for Paper- Setter</u>
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will comprise of short answer type questions covering entire syllabus.
Candidate will have to attempt five questions in all, selecting one question from each unit. First question will be compulsory.
Practicum will be evaluated by an external and an internal examiner. Examination will be of three-hour duration.

Unit	Topics	Contact Hours
I	Number Systems: Binary, Octal, Hexadecimal etc. Conversions from one number system to another, BCD Number System. BCD Codes: Natural Binary Code, Weighted Code, Self-Complimenting Code, Cyclic Code. Error Detecting and Correcting Codes. Character representations: ASCII, EBCDIC and Unicode. Number Representations: Integer numbers - sign-magnitude, 1's & 2's complement representation. Real Numbers normalized floating point representations.	10
II	Binary Arithmetic: Binary Addition, Binary Subtraction, Binary Multiplication, Binary Division using 1's and 2's Compliment representations, Addition and subtraction with BCD representations. Boolean Algebra: Boolean Algebra Postulates, basic Boolean Theorems, Boolean Expressions, Boolean Functions, Truth Tables, Canonical Representation of Boolean Expressions: SOP and POS, Simplification of Boolean Expressions using Boolean Postulates & Theorems, Kaurnaugh-Maps (upto four variables), Handling Don't Care conditions.	10
III	Logic Gates: Basic Logic Gates – AND, OR, NOT, Universal Gates – NAND, NOR, Other Gates – XOR, XNOR etc. Their symbols, truth tables and Boolean expressions. Combinational Circuits: Design Procedures, Half Adder, Full Adder, Half Subtractor, Full Subtracor, Multiplexers, Demultiplexers, Decoder, Encoder, Comparators, Code Converters.	10
IV	Sequential Circuits: Basic Flip- Flops and their working. Synchronous and Asynchronous Flip –Flops, Triggering of Flip-Flops, Clocked RS, D Type, JK, T type and Master-Slave Flip-Flops. State Table, State Diagram and State Equations. Flip-flops characteristics & Excitation Tables. Sequential Circuits: Designing registers –Serial-In Serial-Out (SISO), Serial-In Parallel-Out (SIPO), Parallel-In Serial-Out (PISO) Parallel-In Parallel-Out (PIPO) and shift registers.	10
V*	Practicum: Students are advised to do laboratory/practical practice not limited to, but including the following types of problems: Number System: • Problems based on Number System and their conversion. • Programs based on Number System conversion. Binary Arithmetic • Problems based on Binary Arithmetic.	25

	• Programs based on Binary Arithmetic. • Problems based on Boolean Expression and their simplification Logic Gates • Understanding working of logic Gates. Combinatorial Circuits: • Designing and understanding various combinational circuits. Sequential Circuits: • Designing and understanding various sequential circuits.	
Suggested Evaluation Methods		
Internal Assessment: ➢ **Theory** • Class Participation: 5 • Seminar/presentation/assignment/quiz/class test etc.: 5 • Mid-Term Exam: 10 ➢ **Practicum** • Class Participation: 5 • Seminar/Demonstration/Viva-voce/Lab records etc.: 5 • Mid-Term Exam: NA		**End Term Examination:** A three hour exam for both theory and practicum.
Part C-Learning Resources		
Recommended Books/e-resources/LMS: • M. Morris Mano, Digital Logic and Computer Design, Prentice Hall of India Pvt. Ltd. • V. Rajaraman, T. Radhakrishnan, An Introduction to Digital Computer Design, Prentice Hall. • Andrew S. Tanenbaum, Structured Computer Organization, Prentice Hall of India Pvt. Ltd. • Nicholas Carter, Schaum's Outlines Computer Architecture, Tata McGraw-Hill.		

*Applicable for courses having practical component.

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KURUKSHETRA UNIVERSITY, KURUKSHETRA

<table>
<tr><th colspan="4">Session: 2023-24</th></tr>
<tr><th colspan="4">Part A - Introduction</th></tr>
<tr><td>Subject</td><td colspan="3">COMPUTER SCIENCE</td></tr>
<tr><td>Semester</td><td colspan="3">I</td></tr>
<tr><td>Name of the Course</td><td colspan="3">Problem Solving through C</td></tr>
<tr><td>Course Code</td><td colspan="3">B23-CSE-101</td></tr>
<tr><td>Course Type: (CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/ VAC)</td><td colspan="3">CC</td></tr>
<tr><td>Level of the course (As per Annexure-I)</td><td colspan="3">100-199</td></tr>
<tr><td>Pre-requisite for the course (if any)</td><td colspan="3"></td></tr>
<tr><td>Course Learning Outcomes(CLO):</td><td colspan="3">After completing this course, the learner will be able to:
1. learn the basics of C program, data types and input/output statements.
2. understand different types of operators, their hierarchies and also control statements of C.
3. implement programs using arrays and strings.
4. get familiar with advanced concepts like structures, union etc. in C language.
5*. to implement the programs based on various concepts of C.</td></tr>
<tr><td rowspan="2">Credits</td><td>Theory</td><td>Practical</td><td>Total</td></tr>
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<tr><td>Contact Hours</td><td>3</td><td>2</td><td>5</td></tr>
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Candidate will have to attempt five questions in all, selecting one question from each unit. First question will be compulsory.</td></tr>
</table>

Practicum will be evaluated by an external and an internal examiner. Examination will be of three-hour duration.

Unit	Topics	Contact Hours
I	Overview of C: History, Importance, Structure of C Program, Character Set, Constants and Variables, Identifiers and Keywords, Data Types, Assignment Statement, Symbolic Constant. Input/output: Formatted I/O Function-, Input Functions viz. scanf(), getch(), getche(), getchar(), gets(), output functions viz. printf(), putch(), putchar(), puts().	10
II	Operators & Expression: Arithmetic, Relational, Logical, Bitwise, Unary, Assignment, Conditional Operators and Special Operators Operator Hierarchy; Arithmetic Expressions, Evaluation of Arithmetic Expression, Type Casting and Conversion. Decision making with if statement, if-else statement, nested if statement, else-if ladder, switch and break statement, goto statement, Looping Statements: for, while, and do-while loop, jumps in loops.	10
III	Arrays: One Dimensional arrays - Declaration, Initialization and Memory representation; Two Dimensional arrays -Declaration, Initialization and Memory representation. Functions: definition, prototype, function call, passing arguments to a function: call by value; call by reference, recursive functions. Strings: Declaration and Initialization, String I/O, Array of Strings, String Manipulation Functions: String Length, Copy, Compare, Concatenate etc., Search for a Substring.	10
IV	Pointers in C: Declaring and initializing pointers, accessing address and value of variables using pointers; Pointers and Arrays. User defined data types: Structures - Definition, Advantages of Structure, declaring structure variables, accessing structure members, Structure members initialization, Array of Structures; Unions - Union definition; difference between Structure and Union.	10
V*	Practicum: Students are advised to do laboratory/practical practice not limited to, but including the following types of problems: • To read radius of a circle and to find area and circumference • To read three numbers and find the biggest of three • To check whether the number is prime or not • To read a number, find the sum of the digits, reverse the number and check it for palindrome • To read numbers from keyboard continuously till the user presses 999 and to find the sum of only positive numbers • To read percentage of marks and to display appropriate message (Demonstration of else-if ladder) • To find the roots of quadratic equation • To read marks scored by n students and find the average of marks (Demonstration of single dimensional array)	25

	• To remove Duplicate Element in a single dimensional Array • To perform addition and subtraction of Matrices • To find factorial of a number • To generate Fibonacci series • To remove Duplicate Element in a single dimensional Array • To find the length of a string without using built in function • To demonstrate string functions • To read, display and add two m x n matrices using functions • To read a string and to find the number of alphabets, digits, vowels, consonants, spaces and special characters • To Swap Two Numbers using Pointers • To demonstrate student structure to read & display records of n students • To demonstrate the difference between structure & union.	

Suggested Evaluation Methods

Internal Assessment: ➢ **Theory** • Class Participation: 5 • Seminar/presentation/assignment/quiz/class test etc.: 5 • Mid-Term Exam: 10 ➢ **Practicum** • Class Participation: 5 • Seminar/Demonstration/Viva-voce/Lab records etc.: 5 • Mid-Term Exam: NA	**End Term Examination:** A three hour exam for both theory and practicum.

Part C-Learning Resources

Recommended Books/e-resources/LMS:

- Gottfried, Byron S., Programming with C, Tata McGraw Hill.
- Balagurusamy, E., Programming in ANSI C, Tata McGraw-Hill.
- Jeri R. Hanly & Elliot P. Koffman, Problem Solving and Program Design in C, Addison Wesley.
- Yashwant Kanetker, Let us C, BPB.
- Rajaraman, V., Computer Programming in C, PHI.
- Yashwant Kanetker, Working with C, BPB.

*Applicable for courses having practical component.

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KURUKSHETRA UNIVERSITY, KURUKSHETRA

Session: 2023-24			
PartA - Introduction			
Subject	COMPUTER SCIENCE/ COMPUTER APPLICATIONS		
Semester	I		
Name of the Course	Basics of Computer Science		
Course Code	B23-CSE-103 (Common with B23-CAC-103)		
Course Type: (CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/ VAC)	CC-M		
Level of the course (As per Annexure-I	100-199		
Pre-requisite for the course (if any)			
Course Learning Outcomes (CLO):	After learning this course student will be able: 1. To introduce to the students, the basic understanding of the working of a computer system. 2. To familiarize the students with the concept of algorithms and flowchart. 3. To familiarize the students with the various types of software. 4. To make the students familiar with the basic internet technology and concepts.		
Credits	Theory	Practical	Total
	1	1	2
Contact Hours	1	2	3
Max. Marks:50(30(T)+20(P)) **Internal Assessment Marks:15(10(T)+5(P))** **End Term Exam Marks:35(20(T)+15(P))**		**Time: 3 Hrs.(T), 3Hrs.(P)**	

PartB-Contentsofthe Course

Instructions for Paper- Setter

Unit	**Topics**	**Contact Hours**
I	Introduction to Computers: Definition of Computers, History and Generations of Computers, Characteristics of computer, Classification of Computers. Fundamental Block diagram of Computer: CPU, Input & Output Unit.	4

II	Software: Definition of Software, Types of Software-System software, Application software and Utility software. Types of Computer Languages, Assemblers, Interpreters, Compiler.	4
III	Introduction to OperatingSystems: Types of Operating System, Functions of Operating System. Windows: Introduction to Windows, Starting Windows, Desk Top, Task Bar, Opening and closing applications, icons-creating, renaming and removing. Date and Time setting, Working with files and folders-creating, deleting, opening, finding, copying, moving, and renaming.	4
IV	Networking: Concept, Basic Elements of a Communication System, Data Transmission Media, LAN, MAN, WAN. Introduction of Internet and WWW, Basic working of a Web Browser, Introduction to popular web browsers.	4
V*	Practicum: Students are advised to do laboratory/practical practice not limited to, but including the following types of problems: • Dismantling the system unit, recognize all major components inside a PC, describe function of each component and define the relationship of internal components • Explore and describe some system utility like regedit, memory portioning, control panel, window tools. • Understanding control panel • Date and Time setting. • Working with files and folders-creating, deleting, opening, finding, copying, moving, and renaming.	25

Suggested Evaluation Methods

Internal Assessment: ➢ **Theory** • Class Participation: 4 • Seminar/presentation/assignment/quiz/class test etc.: NA • Mid-Term Exam: 6 ➢ **Practicum** • Class Participation: NA • Seminar/Demonstration/Viva-voce/Lab records etc.: 5 • Mid-Term Exam: NA	**End Term Examination:** **A three hour exam for both theory and practicum.**

PartC-Learning Resources

Text /Reference Books:

• Fundamentals of Computers, V. Rajaraman 6th edition PHI Learning Private Limited 2014

- Peter Norton: Computing Fundamentals. 6th Edition, McGraw Hill-Osborne,2007
- Alexis Leon and Marthews Leon: Introduction to Computers, Leon Vikas,1999.
- Internet Basics. E.DouglasCommer PHI.

*Applicable for courses having practical component.

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<tr><td>Subject</td><td colspan="4">COMPUTER SCIENCE/ COMPUTER APPLICATIONS</td></tr>
<tr><td>Semester</td><td colspan="4">I</td></tr>
<tr><td>Name of the Course</td><td colspan="4">Fundamentals of Computer Science</td></tr>
<tr><td>Course Code</td><td colspan="4">B23-CSE-104 (Common with B23-CAC-104)</td></tr>
<tr><td>Course Type: (CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/ VAC)</td><td colspan="4">MDC</td></tr>
<tr><td>Level of the course (As per Annexure-I</td><td colspan="4">100-199</td></tr>
<tr><td>Pre-requisite for the course (if any)</td><td colspan="4"></td></tr>
<tr><td>Course Learning Outcomes(CLO):</td><td colspan="4">After completing this course, the learner will be able to:
1. understand the basic concepts of operating systems
2. do the basic editing and formatting in a document
3. create basic spread-sheets for different purposes
4. create basic presentations for different applications
5*. to understand the working of operating system and various office tools practically.</td></tr>
<tr><td rowspan="2">Credits</td><td>Theory</td><td>Practical</td><td colspan="2">Total</td></tr>
<tr><td>2</td><td>1</td><td colspan="2">3</td></tr>
<tr><td>Contact Hours</td><td>2</td><td>2</td><td colspan="2">4</td></tr>
<tr><td colspan="3">Max. Marks:75(50(T)+25(P))
Internal Assessment Marks:20(15(T)+5(P))
End Term Exam Marks: 55(35(T)+20(P))</td><td colspan="2">Time: 3 Hrs.(T), 3Hrs.(P)</td></tr>
<tr><th colspan="5">Part B- Contents of the Course</th></tr>
<tr><td colspan="5"><u>Instructions for Paper- Setter</u>
Examiner will set a total of nine questions. Out of which first question will be compulsory. Remaining eight questions will be set from four unit selecting two questions from each unit. Examination will be of three-hour duration. All questions will carry equal marks. First question will comprise of short answer type questions covering entire syllabus.
Candidate will have to attempt five questions in all, selecting one question from each unit. First question will be compulsory.
Practicum will be evaluated by an external and an internal examiner. Examination will be of three-hour duration.</td></tr>
<tr><th>Unit</th><th colspan="3">Topics</th><th>Contact</th></tr>
</table>

		Hours
I	Computer Fundamentals: Evolution of Computers through generations, Characteristics of Computers, Strengths and Limitations of Computers, Classification of Computers, Functional Components of a Computer System, Applications of computers in Various Fields. Types of Software: System software, Application software, Utility Software.	7
II	Memory Systems: Concept of bit, byte, word, nibble, storage locations and addresses, measuring units of storage capacity, access time, concept of memory hierarchy. Primary Memory - RAM, ROM, PROM, EPROM. Secondary Memory - Types of storage devices, Magnetic Tape, Hard Disk, Optical Disk, Flash Memory. I/O Devices: I/O Ports of a Desk Top Computer, Device Controller, Device Driver. Input Devices: classification and use, keyboard, pointing devices - mouse, touch pad and track ball, joystick, magnetic stripes, scanner, digital camera, and microphone Output Devices: speaker, monitor, printers: classification, laser, ink jet, dot-matrix. Plotter.	7
III	Introduction to Operating System**:** Definition, Functions, Features of Operating System, Icon, Folder, File, Start Button, Task Bar, Status Buttons, Folders, Shortcuts, Recycle Bin, Desktop, My Computer, My Documents, Windows Explorer, Control Panel.	5
IV	The Internet: Introduction to networks and internet, history, Internet, Working of the Internet, Modes of Connecting to Internet. Electronic Mail: Introduction, advantages and disadvantages, User Ids, Passwords, e-mail addresses, message components, message composition, mailer features. Browsers and search engines.	6
V*	Operating System: • Starting with basics of Operating Systems and its functionalities Computer Basics: • Identify the various computer hardware • Understanding the working of computer • Understanding various types of software Internet and E-mail: • Using Internet for various tasks • Creating and using e-mail.	25
Suggested Evaluation Methods		
Internal Assessment: ➢ **Theory** • Class Participation: 4 • Seminar/presentation/assignment/quiz/class test etc.:4 • Mid-Term Exam: 7 ➢ **Practicum** • Class Participation: 2 • Seminar/Demonstration/Viva-voce/Lab records etc.:3		**End Term Examination:** A three hour exam for both theory and practicum.

• Mid-Term Exam: NA	

Part C-Learning Resources

Recommended Books/e-resources/LMS:

- Sinha, P.K. & Sinha, Priti, Computer Fundamentals, BPB.
- Dromey, R.G., How to Solve it By Computer, PHI.
- Norton, Peter, Introduction to Computer, McGraw-Hill.
- Leon, Alexis & Leon, Mathews, Introduction to Computers, Leon Tech World.
- Rajaraman, V., Fundamentals of Computers, PHI.

*Applicable for courses having practical component.

BCA (BACHELOR OF COMPUTER APPLICATIONS)

PROGRAMME OUTCOMES (POs)

PO1	Knowledge	Capable of demonstrating comprehensive disciplinary knowledge gained during course of study.
PO2	Communication	Ability to communicate effectively on general and scientific topics with the scientific community and with society at large.
PO3	Problem Solving	Capability of applying knowledge to solve scientific and other problems.
PO4	Individual and Team Work	Capable to learn and work effectively as an individual, and as a member or leader in diverse teams, in multidisciplinary settings.
PO5	Investigation of Problems	Ability of critical thinking, analytical reasoning and research based knowledge including design of experiments, analysis and interpretation of data to provide conclusions.
PO6	Modern Tool Usage	Ability to use and learn techniques, skills and modern tools for scientific practise.
PO7	Science and Society	Ability to apply reasoning to access the different issues related to society and the consequent responsibilities relevant to the professional scientific practices.
PO8	Life-Long Learning	Aptitude to apply knowledge and skills that are necessary for participating in learning activities throughout the life.
PO9	Environment and Sustainability	Ability to design and develop modern systems which are environmentally sensitive and to understand the importance of sustainable development.
PO10	Ethics	Apply ethical principles and professional responsibilities in scientific practices.
PO11	Project Management	Ability to demonstrate knowledge and understanding of the scientific principles and apply these to manage projects.

PROGRAMME SPECIFIC OUTCOMES (PSOs)

PSO1	Develop proficiency for solving real world problems with the application of programming and supplementary computing skills.
PSO2	Promote exposure to hardware as well as software knowledge with the inclusion of course content targeted to administer technical expertise for employment in the IT industry.
PSO3	Explicit course content is targeted to inculcate programming skills using both conventional and contemporary programming languages as well as to develop potential for realizing web oriented and other commercial/non-commercial applications.
PSO4	Judicious structuring of the course curriculum has been aimed in order to strengthen competitive ability as per the trending industry requirements.
PSO5	Encourage skillful expertise for employment in Commercial/ Government sectors or pursuance of higher studies aimed towards innovational research leading to the progressive growth of the society and the nation.

BACHELOR OF COMPUTER APPLICATIONS
SCHEME OF EXAMINATION – SECOND YEAR(w.e.f. 2014-15)

Paper No.	Title of Paper	External Marks	Internal Assessment	Maximum Marks	Pass Marks	Exam Duration
	Semester – III					
BCA-231	Object Oriented Programming Using C++	80	20	100	35	3hrs
BCA-232	Data Structures	80	20	100	35	3hrs
BCA-233	Computer Architecture	80	20	100	35	3hrs
BCA-234	Software Engineering	80	20	100	35	3hrs
BCA-235	Fundamentals of Data Base Systems	80	20	100	35	3hrs
BCA-236	Computer Oriented Numerical Methods	80	20	100	35	3hrs
	Semester – IV					
BCA-241	Advanced Data Structures	80	20	100	35	3hrs
BCA-242	Advanced Programming using C++	80	20	100	35	3hrs
BCA-243	E-Commerce	80	20	100	35	3hrs
BCA-244	Relational Data Base Management System	80	20	100	35	3hrs
BCA-245	Computer Oriented Statistical Methods	80	20	100	35	3hrs
BCA-246	Management Information System	80	20	100	35	3hrs
BCA -251	Lab – I Based on BCA-231 & BCA-242	100			35	3hrs
BCA -252	Lab – II Based on BCA-232 & BCA-241	100			35	3hrs

Internal assessment will be based on the following criteria:

(I)	Two Handwritten Assignments (Ist Assignment after one month & IInd Assignment after two months)	:	10 marks
(II)	One Class Test (one period duration)	:	5 marks
(III)	Attendance	:	5 marks

Marks for Attendance will be given as under:

1. 91% onwards : 5Marks
2. 81% to 90% : 4Marks
3. 75% to 80% : 3Marks
4. 70% to 75% : 2Marks*
5. 65% to 70% : 1Mark*

* For students engaged in co-curricular activities of the colleges only/authenticated medical grounds duly approved by the concerned Principal.

NOTE: 1. Practical exam will be conducted annually in two sessions. However the workload will be distributed in both the semesters according to the relevant papers.

BACHELOR OF COMPUTER APPLICATIONS
SCHEME OF EXAMINATION – THIRD YEAR(w.e.f 2015-16)

Paper No.	Title of Paper	MarksExternal	AssessmentInternal	MarksMaximum	MarksPass	DurationExam
	Semester – V					
BCA-351	Web Designing Fundamentals	80	20	100	35	3hrs
BCA-352	Operating System-I	80	20	100	35	3hrs
BCA-353	Artificial Intelligence	80	20	100	35	3hrs
BCA-354	Computer Networks	80	20	100	35	3hrs
BCA-355	Programming Using Visual Basic	80	20	100	35	3hrs
BCA-356	Multimedia Tools	80	20	100	35	3hrs
	Semester – VI					
BCA-361	Web Designing Using Advanced Tools	80	20	100	35	3hrs
BCA-362	Operating System-II	80	20	100	35	3hrs
BCA-363	Computer Graphics	80	20	100	35	3hrs
BCA-364	Internet Technologies	80	20	100	35	3hrs
BCA-365	Advanced Programming with Visual Basic	80	20	100	35	3hrs
BCA-366	Programming in Core Java	80	20	100	35	3hrs
BCA-371	Lab – I Based on BCA-351 & 361	100			35	3hrs
BCA-372	Lab – II Based on BCA-355 & 365	100			35	3hrs

Internal assessment will be based on the following criteria:

(I) Two Handwritten Assignments : 10 marks
(Ist Assignment after one month & IInd Assignment after two months)

(II) One Class Test : 5 marks
(one period duration)

(III) Attendance : 5 marks

Marks for Attendance will be given as under:

1. 91% onwards : 5Marks
2. 81% to 90% : 4Marks
3. 75% to 80% : 3Marks
4. 70% to 75% : 2Marks*
5. 65% to 70% : 1Mark*

* For students engaged in co-curricular activities of the colleges only/authenticated medical grounds duly approved by the concerned Principal.

NOTE: 1. Practical exam will be conducted annually in two sessions. However the workload will be distributed in both the semesters according to the relevant papers.

BCA – 231 OBJECT ORIENTED PROGRAMMING USING 'C++'

Maximum Marks: 100 **External: 80**
Minimum Pass Marks: 35 **Internal: 20**

Time: 3 hours

Note: Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

UNIT – I

Object oriented Programming: Object-Oriented programming features and benefits. Object-Oriented features of C++, Class and Objects, Data Hiding & Encapsulation, Structures, Data members and Member functions, Scope resolution operator and its significance, Static Data Members, Static member functions, Nested and Local Class, Accessing Members of Class and Structure.

UNIT – II

Constructor, Initialization using constructor, types of constructor– Default, Parameterized & Copy Constructors, Constructor overloading, Default Values to Parameters, Destructors, Console I/O: Hierarchy of Console Stream Classes, Unformatted and Formatted I/O Operations.

UNIT – III

Manipulators, Friend Function, Friend Class, Arrays, Array of Objects, Passing and Returning Objects to Functions, String Handling in C++, Dynamic Memory Management: Pointers, new and delete Operator, Array of Pointers to Objects, this Pointer, Passing Parameters to Functions by Reference & pointers.

UNIT – IV

Polymorphism: Operators in C++, Precedence and Associativity Rules, Operator Overloading, Unary & Binary Operators Overloading, Function Overloading, Inline Functions

TEXT BOOKS:

3. Herbert Scildt, C++, The Complete Reference, Tata McGraw-Hill
4. Robert Lafore, Object Oriented Programming in C++, SAMS Publishing

REFERENCE BOOKS:

5. Bjarne Stroustrup, The C++ Programming Language, Pearson Education
6. Balaguruswami, E. , Object Oriented Programming In C++, Tata McGraw-Hill.

BCA – 232 DATA STRUCTURES

Maximum Marks: 100 **External: 80**
Minimum Pass Marks: 35 **Internal: 20**

Time: 3 hours

Note: Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

UNIT – I

Introduction: Elementary data organization, Data Structure definition, Data type vs. data structure, Categories of data structures, Data structure operations, Applications of data structures, Algorithms complexity and time-space tradeoff, Big-O notation.

Strings: Introduction, String strings, String operations, Pattern matching algorithms.

UNIT – II

Arrays: Introduction, Linear arrays, Representation of linear array in memory, Traversal, Insertions, Deletion in an array, Multidimensional arrays, Parallel arrays, Sparce matrics.

Linked List: Introduction, Array vs. linked list, Representation of linked lists in memory, Traversal, Insertion, Deletion, Searching in a linked list, Header linked list, Circular linked list, Two-way linked list, Garbage collection, Applications of linked lists. Algorithms for Insertion, deletion in array, Single linked list

UNIT – III

Stack: Introduction, Array and linked representation of stacks, Operations on stacks, Applications of stacks: Polish notation, Recursion.

Queues: Introduction, Array and linked representation of queues, Operations on queues, Deques, Priority Queues, Applications of queues.

UNIT – IV

Tree: Introduction, Definition, Representing Binary tree in memory, Traversing binary trees, Traversal algorithms using stacks and using recursion.

Graph: Introduction, Graph theory terminology, Sequential and linked representation of graphs.

TEXT BOOKS

1. Seymour Lipschutz, “Data Structure”, Tata-McGraw-Hill

2. Horowitz, Sahni & Anderson-Freed, “Fundamentals of Data Structures in C”, University Press

REFERENCE BOOKS:

4. Trembley, J.P. And Sorenson P.G., “An Introduction to Data Structures With Applications”, Mcgrraw- Hill International Student Edition, New York.

5. Mark Allen Weiss Data Structures and Algorithm Analysis In C, Addison-Wesley, (An Imprint Of Pearson Education), Mexico City.
6. Yedidyan Langsam, Moshe J. Augenstein, and Aaron M. Tenenbaum, “Data Structures Using C”, Prentice- Hall of India Pvt. Ltd., New Delhi.

BCA – 233 COMPUTER ARCHITECTURE

Maximum Marks: 100 **External: 80**

Minimum Pass Marks: 35 **Internal: 20**

Time: 3 hours

Note: Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

UNIT -I

Basic Computer Organisation and Design: Instruction Codes, Computer registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory reference instructions, Input-Output and Interrupt, Design of Basic computer, Design of accumulator logic

UNIT -II

Register Transfer and Microoperations: Register Transfer Language (RTL), register transfer, Bus and Memory Transfers, Arithmetic Microoperations, Logic Microoperations, Shift Microoperations, Arithmetic Logic Shift Unit, Microprogrammed Control: Control memory; address sequencing, microprogram sequencer, Design of Control Unit

UNIT -III

Central Processing Unit: General registers Organization, Stack Organization, Instruction formats, Addressing Modes, Data Transfer and Manipulation, Program Control, Program Interrupt, RISC, CISC.

UNIT -IV

Memory Organization: Memory hierarchy, Auxiliary Memory, Associative Memory, Interleaved memory, Cache memory, Virtual Memory, Memory Management Hardware, Input Output Organization : Peripheral devices , Input-Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupt, Direct Memory Access(DMA),Input-Output Processor(IOP).

TEXT BOOKS

7. Computer System Architecture By. Moris Mano, Pearson Education
8. Computer Architecture and Organization By J.P. Hayes, Tata McGraw Hill

REFERENCE BOOKS:

3. W. Stallings, Computer Organisation and Architecture, 4th Edition, Pearson Education
4. Harry, Jordan, Computer Systems Design & Architecture, Edition, Addison Wesley
5. J. D. Carpinelli, Computer Systems Organization & Architecture, Addison Wesley.
6. P. V. S. Rao, “Computer System Architecture”, PHI, 2009

BCA – 234 SOFTWARE ENGINEERING

Maximum Marks: 100 **External: 80**
Minimum Pass Marks: 35 **Internal: 20**

Time: 3 hours

Note: Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

UNIT – I

Introduction: Program vs. Software , Software Engineering, Programming paradigms, Software Crisis – problem and causes, Phases in Software development: Requirement Analysis, Software Design, Coding, Testing, Maintenance, Software Development Process Models: Waterfall, Prototype, Evolutionary and Spiral models, Role of Metrics.

UNIT – II

Feasibility Study, Software Requirement Analysis and Specifications: SRS, Need for SRS, Characteristics of an SRS, Components of an SRS, Problem Analysis, Information gathering tools, Organizing and structuring information, Requirement specification, validation and Verification. . SCM

UNIT – III

Structured Analysis and Tools: Data Flow Diagram, Data Dictionary, Decision table, Decision tress, Structured English, Entity-Relationship diagrams, Cohesion and Coupling.
Gantt chart, PERT Chart, Software Maintenance: Type of maintenance, Management of Maintenance, Maintenance Process, maintenance characteristics.
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UNIT – IV

Software Project Planning: Cost estimation: COCOMO model, Project scheduling, Staffing and personnel planning, team structure, Software configuration management, Quality assurance plans, Project monitoring plans, Risk Management. Software testing strategies: unit testing, integration testing, Validation testing, System testing, Alpha and Beta testing.

TEXT BOOKS:

3. Pressman R. S., “Software Engineering – A Practitioner’s Approach”, Tata McGraw Hill.
4. Jalote P., “An Integrated approach to Software Engineering”, Narosa.

REFERENCE BOOKS:

1. Sommerville, “Software Engineering”, Addison Wesley.

3. Fairley R., “Software Engineering Concepts”, Tata McGraw Hill.
4. James Peter, W Pedrycz, “Software Engineering”, John Wiley & Sons.

BCA – 235 FUNDAMENTALS OF DATABASE SYSTEM

Maximum Marks: 100 **External: 80**

Minimum Pass Marks: 35 **Internal: 20**

Time: 3 hours

Note: Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

UNIT – I

Basic Concepts – Data, Information, Records and files. Traditional file – based Systems-File Based Approach-Limitations of File Based Approach, Database Approach-Characteristics of Database Approach, Database Management System (DBMS), Components of DBMS Environment, DBMS Functions and Components, Advantages and Disadvantages of DBMS, Roles in the Database Environment - Data and Database Administrator, Database Designers, Applications Developers and Users.

UNIT – II

Database System Architecture – Three Levels of Architecture, External, Conceptual and Internal Levels, Schemas, Mappings and Instances, Data Independence – Logical and Physical Data Independence, Classification of Database Management System, Centralized and Client Server architecture to DBMS.

UNIT – III

Data Models: Records- based Data Models, Object-based Data Models, Physical Data Models and Conceptual Modeling, Entity-Relationship Model – Entity Types, Entity Sets, Attributes Relationship Types, Relationship Instances and ER Diagrams.

UNIT – IV

Relational Data Model:-Brief History, Terminology in Relational Data Structure, Relations, Properties of Relations, Keys, Domains, Integrity Constraints over Relations, Base Tables and Views, Basic Concepts of Hierarchical and Network Data Model.

TEXT BOOKS:

3. Elmasri & Navathe, “Fundamentals of Database Systems”, 5th edition, Pearson Education.

REFERENCE BOOKS:

3. Thomas Connolly Carolyn Begg, “Database Systems”, 3/e, Pearson Education
4. C. J. Date, “An Introduction to Database Systems”, 8th edition, Addison Wesley N. Delhi.

BCA- 236 COMPUTER-ORIENTED NUMERICAL METHODS

Maximum Marks: 100 **Time: 3 hours**
Minimum Pass Marks: 35

Note: Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

UNIT-I

Computer Arithmetic: Floating-point representation of numbers, arithmetic operations with normalized floating-point numbers and their consequences, significant figures.
Error in number representation-inherent error, truncation, absolute, relative, percentage and round-off error.
Iterative Methods: Bisection, False position, Newton-Raphson method. Iteration method, discussion of convergence, Bairstow's method.

UNIT-II

Solution of simultaneous linear equations and ordinary differential equations: Gauss-Elimination methods, pivoting, Ill-conditioned equations, refinement of solution. Gauss-Seidal iterative method, Euler method, Euler modified method, Taylor-series method, Runge-Kutta methods, Predictor-Corrector methods.

UNIT-III

Interpolation and Approximation:
Polynomial interpolation: Newton, Lagranges, Difference tables, Approximation of functions by Taylor Series.
Chebyshev polynomial: First kind, Second kind and their relations, Orthogonal properties.

UNIT-IV

Numerical Differentiation and integration: Differentiation formulae based on polynomial fit, pitfalls in differentiation, Trapezoidal & Simpson Rules, Gaussian Quadrature.

REFERENCE BOOKS

5. V. Rajaraman, Computer Oriented Numerical Methods, Prentice Hall, India.
6. S. S. Sastry, Introductory Methods of Numerical Analysis.
7. M. K. Jain, S.R.K. Iyengar & R. K. Jain, Numerical Methods for Scientific and Engineering Computation.
8. H. C. Saxena, Finite Differences and Numerical Analysis.

BCA – 241 ADVANCED DATA STRUCTURE

Maximum Marks: 100 **External: 80**
Minimum Pass Marks: 35 **Internal: 20**

Time: 3 hours

Note: Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

UNIT – I

Tree: Introduction, Definition, Representing Binary tree in memory, Traversing binary trees, Traversal algorithms using stacks, Binary search trees: introduction, storage, Searching, Insertion and deletion in a Binary search tree, Huffman's algorithm, General trees.

UNIT – II

Graph: Introduction, Graph theory terminology, Sequential and linked representation of graphs, operations on graphs, traversal algorithms in graphs and their implementation, Warshall's algorithm for shortest path, Dijkstra algorithm for shortest path.

UNIT – III

Sorting: Internal & external sorting, Radix sort, Quick sort, Heap sort, Merge sort, Tournament sort, Comparison of various sorting and searching algorithms on the basis of their complexity.

UNIT – IV

Files: Introduction Attributes of a file, Classification of files, File operations, Comparison of various types of files, File organization: Sequential, Indexed-sequential, Random-access file.
Hashing: Introduction, Collision resolution.

TEXT BOOKS

3. Seymour Lipschutz, "Data Structure using C", Tata-McGraw-Hill
4. Horowitz, Sahni & Anderson-Freed, "Fundamentals of Data Structures in C", University Press

REFERENCE BOOKS

6. Trembley, J.P. And Sorenson P.G., "An Introduction to Data Structures With Applications", Mcgrraw- Hill International Student Edition, New York.
7. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", Addison-Wesley, (An Imprint Of Pearson Education), Mexico City.

BCA – 242 Advanced PROGRAMMING USING C++

Maximum Marks: 100 **External: 80**
Minimum Pass Marks: 35 **Internal: 20**

Time: 3 hours

Note: Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

UNIT – I

Dynamic Polymorphism: Function Overriding, Virtual Function and its Need, Pure Virtual Function, Abstract Class, Virtual Derivation, Virtual Destructor.

UNIT – II

Type Conversion: Basic Type Conversion, Conversion between objects and basic types, Conversion between objects of different classes, Inheritance: Rules of Derivations – Private, Protected and Public Derivations.

UNIT – III

Different Forms of Inheritance – Single, Multiple, Multilevel, Hierarchical and Multipath Inheritance Roles of Constructors and Destructors in Inheritance, Genericity in C++: Templates in C++, Function templates.

UNIT – IV

Class templates in C++, Exception Handling in C++: try, throw and catch, Files I/O in C++: Class Hierarchy for Files I/O, Text versus Binary Files,
Opening and Closing Files, File Pointers, Operation on files.

TEXT BOOKS:

3. Herbert Scildt, C++, The Complete Reference, Tata McGraw-Hill
4. Robert Lafore, Object Oriented Programming in C++, SAMS Publishing

REFERENCE BOOKS:

3. Bjarne Stroustrup, The C++ Programming Language, Pearson Education
4. Balaguruswami, E. , Object Oriented Programming In C++, Tata McGraw-Hill

BCA-243 E-Commerce

Maximum Marks: 100 **External: 80**
Minimum Pass Marks: 35 **Internal: 20**
Time: 3 hours

Note: Examiner will be required to set Nine Questions in all. First question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

Unit-I

Introduction to E-Commerce: -Business operations; E-commerce practices vs. traditional business practices; concepts of b2b, b2c,c2c,b2g,g2h,g2c; Features of E-Commerce, Types of Ecommerce Systems, Elements of E-Commerce, principles of E-Commerce, Benefits and Limitations of E-Commerce.

Management Issues relating to e-commerce. Operations of E-commerce: Credit card transaction; Secure Hypertext Transfer Protocol (SHTP); Electronic payment systems; Secure electronic transaction (SET); SET`s encryption; Process; Cybercash; Smart cards; Indian payment models.

Unit-II

Applications in governance: EDI in governance; E-government; E-Governance applications of Internet; concept of government –to- business, business-to-government and citizen-to-government; E-governance models; Private sector interface in E-governance. Applications in B2C: Consumers shopping procedure on the Internet; Impact on disinter mediation and re-intermediation; Global market; Strategy of traditional department stores.

Unit-III

Products in b2c model; success factors of e-brokers; Broker-based services on-line; On-line travel tourism services; Benefits and impact of e-commerce on travel industry; Deal estate market; online stock trading and its benefits; Online banking and its benefits; On-line financial services and their future; E-auctions – benefits, implementation and impact.

Unit-IV

Applications in B2B: Key technologies for b2b; architectural models of b2b, characteristics of the supplier –oriented marketplace, buyer-oriented marketplace and intermediary-oriented marketplace; Just In Time delivery in b2b; Internet-based EDI from traditional EDI; Marketing Issues in b2b.

Emerging Business models: Retail model; Media model; advisory model, made-to-order manufacturing model; Do-it- yourself model; Information service model; Emerging hybrid

models; Emerging models in India, Internet & E-Commerce scenario in India; Internet security Issues; Legal aspects of E-commerce

TEXT BOOKS:

5. Turban E,. Lee J. , King D. and Chung H. M: “Electronic commerce-a Managerial Perspective”, Prentice-Hall International, Inc.
6. Bhatia V. , “E-commerce”, Khanna Book Pub. Co. (P) Ltd. , Delhi.

BCA – 244 RELATIONAL DATABASE MANAGEMENT SYSTEM

Maximum Marks: 100 **External: 80**

Minimum Pass Marks: 35 **Internal: 20**

Time: 3 hours

Note: Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

UNIT – I

Relational Model Concepts, Codd's Rules for Relational Model, Relational Algebra:-Selection and Projection, Set Operation, Renaming, Join and Division, Relational Calculus: Tuple Relational Calculus and Domain Relational Calculus.

UNIT – II

Functional Dependencies and Normalization:-Purpose, Data Redundancy and Update Anomalies, Functional Dependencies:-Full Functional Dependencies and Transitive Functional Dependencies, Characteristics of Functional Dependencies, Decomposition and Normal Forms (1NF, 2NF, 3NF & BCNF).

UNIT – III

SQL: Data Definition and data types, SQL Operators, Specifying Constraints in SQL, Basic DDL, DML and DCL commands in SQL, Simple Queries, Nested Queries, Tables, Views, Indexes, Aggregate Functions, Clauses

UNIT – IV

PL/SQL architecture, PL/SQL and SQL*Plus, PL/SQL Basics, Advantages of PL/SQL, The Generic PL/SQL Block: PL/SQL Execution Environment, PL/SQL Character set and Data Types, Control Structure in PL/SQL,
Cursors in PL/SQL, Triggers in PL/SQL, Programming using PL/SQL.

TEXT BOOKS:

3. Elmasri & Navathe, "Fundamentals of Database Systems", 5th edition, Pearson Education.
2. Ivan Bayross, "SQL, PL/SQL-The Programming Language of ORACLE", BPB Publications 3rd edition.

REFERENCE BOOKS:

5. C. J. Date, "An Introduction to Database Systems", 8th edition, Addison Wesley N. Delhi.
6. Oracle 8 –PL/SQL programming –Scott Urman
7. A Guide to the SQL Standard, Data,C. and Darwen, H.3rd Edition, Reading, MA:1994, Addison-Wesley Publications, New Delhi.

BCA – 245 COMPUTER-ORIENTED STATISTICAL METHODS

Maximum Marks: 100 **External: 80**
Minimum Pass Marks: 35 **Internal: 20**
Time: 3 hours

Note: Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

UNIT-I

Basic Statistics: Preparing Frequency Distribution Table and Cumulative frequency, Measure of Central Tendency, Types: Arithmetic mean, Geometric Mean, Harmonic Mean, Median, Mode.

Measure of Dispersion: Range, Quartile Deviation, mean deviation, Coefficient of mean Deviation, Standard Deviation

Moments : Moments About mean, Moments about any point, Moment about origin, Moment about mean in terms of moment about any point, Moment about any point in terms of Moment about mean.

UNIT-II

Probability Distribution: Random Variable- Discrete Random and Continuous Random variable, Probability Distribution of a Random Variable, Mathematical Expectation

Types: Binomial, Poisson, Normal Distribution, Mean and Variance of Binomial, Poisson, and Normal Distribution.

Correlation: Introduction, Types, Properties, Methods of Correlation: Karl Pearson's Coefficient of Correlation, Rank Correlation and Concurrent Deviation method, Probable error.

UNIT-III

Regression: Introduction, Aim of Regression Analysis, Types of Regression Analysis, Lines of Regression, Properties of Regression Coefficient and Regression Lines, Comparison with Correlation.

Curve Fitting: Straight Line, Parabolic curve, Geometric Curve and Exponential Curve

Baye's Theorem in Decision Making, Forecasting Techniques

UNIT-IV

Sample introduction, Sampling: Meaning, methods of Sampling, Statistical Inference: Test of Hypothesis, Types of hypothesis, Procedure of hypothesis Testing, Type I and Type II error, One Tailed and two tailed Test, Types of test of Significance: Test of significance for Attribute-Test of No. of success and test of proportion of success, Test of significance for large samples - Test of significance for single mean and Difference of mean, Test of significance for small samples (t-test) – test the significance between the mean of a random sample, between the mean of two independent samples

Chi square Test, ANOVA: Meaning, Assumptions, One way classification, ANOVA Table for One-Way Classified Data

REFERENCE BOOKS

4. Gupta S.P. and Kapoor, V.K., Fundamentals of Applied statistics, Sultan Chand & Sons, 1996.
5. Gupta S.P. and Kapoor, V.K., Fundamentals of Mathematical statistics, Sultan Chand and Sons, 1995.
6. Graybill, Introduction to Statistics, McGraw.
7. Anderson, Statistical Modelling, McGraw.

BCA – 246 MANAGEMENT INFORMATION SYSTEM

Maximum Marks: 100 **External: 80**

Minimum Pass Marks: 35 **Internal: 20**

Time: 3 hours

Note: Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

UNIT – I

Introduction to system and Basic System Concepts, Types of Systems, The Systems Approach, Information System: Definition & Characteristics, Types of information, Role of Information in Decision-Making, Sub-Systems of an Information system: EDP and MIS management levels, EDP/MIS/DSS.

UNIT –II

An overview of Management Information System: Definition & Characteristics, Components of MIS, Frame Work for Understanding MIS: Information requirements & Levels of Management, Simon's Model of decision-Making, Structured Vs Un-structured decisions, Formal vs. Informal systems.

UNIT – III

Developing Information Systems: Analysis & Design of Information Systems: Implementation & Evaluation, Pitfalls in MIS Development.

UNIT – IV

Functional MIS: A Study of Personnel, Financial and production MIS, Introduction to e-business systems, ecommerce – technologies, applications, Decision support systems – support systems for planning, control and decision-making

TEXT BOOK:

4. J. Kanter, “Management/Information Systems”, PHI.
5. Gordon B. Davis, M. H. Olson, “Management Information Systems – Conceptual foundations, structure and Development”, McGraw Hill.

REFERENCE BOOK:

(7) James A. O’Brien, “Management Information Systems”, Tata McGraw-Hill.

(8) James A. Senn, “Analysis & Design of Information Systems”, Second edition, McGraw Hill.

(9) Robert G. Murdick & Joel E. Ross & James R. Claggett, “Information Systems for Modern Management”, PHI.

(10) Lucas, “Analysis, Design & Implementation of Information System”, McGraw Hill.

Maximum Marks: 100 **External: 80**
Minimum Pass Marks: 35 **Internal: 20**
Time: 3 hours

Note: Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

UNIT – I

Introduction to Internet and World Wide Web; Evolution and History of World Wide Web; Basic Features; Web Browsers; Web Servers; Hypertext Transfer Protocol; URLs; Searching and Web-Casting Techniques; Search Engines and Search Tools

UNIT – II

Steps for Developing Website; Choosing the Contents; Home Page; Domain Names; Internet Service Provider; Planning and Designing Web Site; Creating a Website; Web Publishing: Hosting Site;

UNIT-III

Introduction to HTML; Hypertext and HTML; HTML Document Features;
HTML Tags; Header, Title, Body, Paragraph, Ordered/Unordered Line, Creating Links; Headers; Text Styles; Text Structuring; Text Colors and Background; Formatting Text; Page layouts; Insertion of Text, Movement of Text

UNIT – IV

Images: Types of Images, Insertion of Image, Movement of Image, Ordered and Unordered lists; Inserting Graphics; Table Handling Functions like Columns, Rows, Width, Colours; Frame Creation and Layouts; Working with Forms and Menus; Working with Buttons like Radio, Check Box;

TEXT BOOKS:

5. Bayross Ivan, "Web Enabled Commercial Applications Development using HTML, Javascript, DHTML & PHP", BPB Publication, 2005
6. Powell Thomas, "The Complete Reference HTML & CSS", Tat Mc-Graw Hill, 2010

REFERENCE BOOKS:

7. Wendy Willard, "HTML Beginners Guide", Tata McGraw-Hill
8. Deitel and Goldberg, "Internet and World Wide Web, How to Program", PHI.

BCA-352: Operating System-I

Maximum Marks: 100 **External: 80**
Minimum Pass Marks: 35 **Internal: 20**
Time: 3 hours

Note: Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

UNIT – I

Operating System: Definition, Characteristics, Components, Functions, Examples; Types of Operating System: Single User/Multi User, Classification of Operating System: Batch, Multiprogrammed, Timesharing, Multiprocessing, Parallel, Distributed, Real Time; System Calls and System Programs: Process Control, File Manipulation, Device Manipulation, Information Maintenance, Communications

UNIT – II

Process Management: Process concept, Process states and Process Control Block; Process Scheduling: Scheduling Queues, Schedulers, Context Switch; Operation on Processes: Process Creation, Process Termination; Cooperating Processes, Introduction to Threads, Inter-process Communication; CPU Scheduling: Basic Concepts, Scheduling Criteria, Scheduling Algorithms: FCFS, SJF, Priority, Round-Robin, Multilevel Queue, Multilevel Feedback Queue Scheduling

UNIT – III

Deadlocks: System Model, Deadlock Characterization, Methods of Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection and Recovery

Memory Management: Introduction, Swapping, Contiguous Allocation: Single-Partition/Multiple Partition Allocation, External/Internal Fragmentation; Paging: Basic Method, Hardware, Implementation of Page table; Segmentation: Basic Method, Hardware, Implementation of Segment Table, Advantages/Disadvantages of Paging/Segmentation

UNIT – IV

Virtual Memory: Introduction, Demand Paging, Page Replacement, Page Replacement Algorithms: FIFO, Optimal, LRU, Counting; Thrashing and its cause; File Management: File Concepts, File Attributes, File Operations, File Types, File Access/Allocation Methods, File Protection, File Recovery

TEXT BOOKS:

7. Silberschatz A., Galvin P.B.,and Gagne G., "Operating System Concepts", John Wiley & Sons, Inc.,New York.
- Godbole, A.S., "Operating Systems", Tata McGraw-Hill Publishing Company, New Delhi.

REFERENCE BOOKS:

9. Deitel, H.M., "Operating Systems", Addison- Wesley Publishing Company, New York.
- Tanenbaum, A.S., "Operating System- Design and Implementation", Prentice Hall of India, New Delhi.

BCA-353: Artificial Intelligence

Maximum Marks: 100 **External: 80**
Minimum Pass Marks: 35 **Internal: 20**
Time: 3 hours

Note: Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

UNIT – I

Artificial Intelligence : Intelligence, AI Concepts, Various definitions of AI, Knowledge, Knowledge Pyramid, People and Computers: What computers can do better that people, what people can do better than computers; Characteristics of AI Problems, Problem Representation in AI, Components of AI, AI Evolution, Application Areas of AI, History of AI, The Turing Test, The Revised Turing Test

UNIT – II

Expert System: Components of Expert System: Knowledge Base, Inference Engine, User Interface, Features of Expert System, Expert System Life Cycle, Categories of Expert System, Rule Based vs. Model Based Expert Systems, Advantages/Limitations of Expert System, Developing an Expert System: Identification, Conceptualization, Formalization, Implementation, Testing, Using an Expert System, Application Areas of Expert System

UNIT-III

AI and Search Process: Brute Force Search – Depth First/Breadth First Search, Heuristic Search: Hill Climbing, Constraint Satisfaction, Mean End Analysis, Best First Search, A* Algorithm, AO* Algorithm, Beam Search.

UNIT – IV

Natural Language Processing: Introduction, Need, Goal, Fundamental Problems in Natural Language Understanding, How People overcome Natural Language Problems, Speech Recognition: Introduction, Advantages and Approaches, Introduction to Robotics: Parts of a Robot, Controlling a Robot, Intelligent Robots, Mobile Robots

TEXT BOOKS:

7. Henry C.Mishkoff, “Understanding Artifical Intelligence”
8. V S Janakiraman, “Foundation of Artificial Intelligence and Expert Systems”

REFERENCE BOOKS:

5. Dan W. Patterson, “Introduction to Artificial Intelligence and Expert Systems”

BCA-354: Computer Networks

Maximum Marks: 100 **External: 80**
Minimum Pass Marks: 35 **Internal: 20**
Time: 3 hours

Note: Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

UNIT – I

Introduction to Data Communication and Computer Networks; Uses of Computer Networks; Types of Computer Networks and their Topologies; Network Hardware Components: Connectors, Transceivers, Repeaters, Hubs, Network Interface Cards and PC Cards, Bridges, Switches, Routers, Gateways; Network Software: Network Design issues and Protocols; Connection-Oriented and Connectionless Services; OSI Reference Model; Networking Models: Distributed Systems, Client/Server Model, Peer-to-Peer Model, Web-Based Model and Emerging File-Sharing Model;

UNIT – II

Analog and Digital data and signals; Bandwidth and Data Rate, Capacity, Baud Rate; Transmission Impairment; Data Rate Limits; Guided Transmission Media; Wireless Transmission ; Communication Satellites; Switching and Multiplexing; Modems and Modulation techniques; ADSL and Cable Modems;

UNIT - III

Data Link Layer Design issues; Error Detection and Correction; Sliding Window Protocols: One-bit, Go Back N and Selective Repeat; Media Access Control: ALOHA, Slotted ALOHA, CSMA, Collision free protocols; Introduction to LAN technologies: Ethernet, Switched Ethernet, Fast Ethernet, Gigabit Ethernet; Token Ring; Introduction to Wireless LANs and Bluetooth; VLANs

UNIT – IV

Routing Algorithms: Flooding, Shortest Path Routing, Distance Vector Routing; Link State Routing, Hierarchical Routing; Congestion Control; Traffic shaping; Choke packets; Load shedding; Elements of Transport Protocols; Network Security Issues: Security attacks; Encryption methods; Digital Signature; Digital Certificate

TEXT BOOKS:

5. Andrew S. Tanenbaum, “Computer Networks”, Pearson Education.
6. Michael A. Gallo, William M. Hancock, “Computer Communications and Networking Technologies”, CENGAGE Learning.

REFERENCE BOOKS:

4. Behrouz A Forouzan, “Data Communications and Networking”, McGraw Hill.
5. Bhushan Trivedi, “Computer Networks”, Oxford

BCA-355: Programming Using Visual Basic

Maximum Marks: 100 **External: 80**
Minimum Pass Marks: 35 **Internal: 20**
Time: 3 hours

Note: Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

UNIT – I

Introduction to VB: Visual & Non-Visual programming, Procedural, Object-Oriented, Object-Based and Event-Driven Programming Languages, VB as Even-Driven and Object-Based Language, VB Environment: Menu bar, Toolbar, Project explorer, Toolbox, Properties Window, Form Designer, Form Layout, Immediate window, Default Controls in Tool Box Visual Development and Event Driven programming

UNIT – II

Basics of Programming: Variables: Declaring Variables, Types of variables, Converting Variables Types, User Defined Data Types, Forcing Variable Declaration, Scope & Lifetime of Variables.
Constants: Named & Intrinsic, Operators: Arithmetic, Relational & Logical operators, Input/output in VB: Various Controls for I/O, Message box, Input Box, Print statement.

UNIT – III

Decision Statements in VB - if statement, if-then-else, select-case; Looping Statements in VB: do-loop, for-next, while-wend; Exit statement, Nested Control Structure; Arrays: Declaring and using Arrays, One-dimensional, Two-dimensional and Multi-dimensional Arrays, Static and Dynamic arrays, Array of Arrays.

UNIT – IV

Procedures: General & Event Procedures, Subroutines, Functions, Calling Procedures, Arguments - Passing Mechanisms, Optional Arguments, Named Arguments, Functions Returning Custom Data Types
Simple Program Development in VB such as Sum of Numbers, Greatest among Numbers, Checking Even/Odd Number, HCF of Two Numbers, Generate Prime Numbers, Generate Fibonacci Series, Factorial of a Number, Searching, Sorting, etc.

TEXT BOOKS:

5. Steven Holzner, “Visual Basic 6 Programming: Black Book”, Dreamtech Press.
6. Evangelos Petroutsos, “Mastering Visual Baisc 6”, BPB Publications.
7. Julia Case Bradley & Anita C. Millspaugh, “Programming in Visual Basic 6.0”, Tata McGraw-Hill Edition

REFERENCE BOOKS:

9. Michael Halvorson, “Step by Step Microsoft Visual Basic 6.0 Professional”, PHI
10. “Visual basic 6 Complete”, BPB Publications.
11. Scott Warner, “Teach Yourself Visual basic 6”, Tata McGraw-Hill Edition
12. Brian Siler and Jeff Spotts, “Using Visual Basic 6”, Special Edition, PHI.

BCA-356: Multimedia Tools

Maximum Marks: 100 **External: 80**
Minimum Pass Marks: 35 **Internal: 20**
Time: 3 hours

Note: Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

UNIT – I

Multimedia: Basic Concept, Definition, Components & Applications of Multimedia; Hypermedia and Multimedia; Multimedia Hardware and Software; Multimedia Software Tools; Presentation Tools; Multimedia Authoring: Introduction, Features, Types of Authoring Tools: Card or Page-Based, Icon-Based, Time-Based, Object-Oriented; VRML: History, Features

UNIT – II

Images: Graphics/Image Data Types, File Formats; Color Models in Images and Video;
Video: Introduction, Types of Video Signals; Analog and Digital Video; Analog Video Standards: NTSC, PAL, SECA; Digital Video Standards: Chroma Subsampling, CCIR Standards, HDTV

UNIT – III

Digital Audio: Basic Concepts, Analog vs. Digital Audio, Digitization of Sound; Digital Audio File Formats, MIDI
Quantization and Transmission of Audio: Coding of Audio; Pulse Code Modulation; Differential Coding of Audio; Lossless Predictive Coding; DPCM; DM; ADPCM

UNIT – IV

Compression Techniques: Introduction, Types of Data Compression, Run-Length Coding, Variable-Length Coding, Dictionary-Based Coding, Transform Coding
Image and Video Compression Techniques: JPEG Standard for Image Compression; JPEG Mode, Video Compression Techniques: H.261, H.263, MPEG

TEXT BOOKS:

5. Ze-Nian Li, Mark S. Drew, “Fundamentals of Multimedia”, Pearson Education.
6. Tay Vaughan, “Multimedia Making It Work”, Tata McGraw- Hill.

REFERENCE BOOKS:

8. Ramesh Bangia, “Multimedia and Web Technology”, Firewall Media.
9. John F. Koegel Buford, “ Multimedia Systems”, Addison Wesley, Pearson Education.
10. Ana Weston Solomon, “Introduction to Multimedia”, Tata McGraw-Hill.

BCA-361: Web Designing Using Advanced Tools

Maximum Marks: 100 **External: 80**
Minimum Pass Marks: 35 **Internal: 20**
Time: 3 hours

Note: Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

UNIT – I

Interactivity Tool - JavaScript: Introduction, Features, Data types, Operators, Statements, Functions, Event Handling, Use of Predefined Object and Methods, Frames, Windows, Tables, Images, Links
Interactivity Tool - VBScript: Introduction, Features, Variables, Data Types, Numeric and Literal Constants, Arrays, Operators, Subroutine Procedures, Function Procedures, Control Statements, Strings, Message and Input Boxes, Date and Time, Event Handlers, Embedding VBScript in HTML

UNIT – II

Interactivity Tool - Active Script Pages – Introduction, Features, Client-Server Model, Data Types, Decision Making Statements, Control statements, Use of Various Objects of ASP, Various Techniques of Connecting to Database
Other Interactivity Tools - Macromedia Flash, Macromedia Dreamweaver, PHP: Basic Introduction and Features

UNIT – III

DHTML: Introduction, Features, Events, Dynamic Positioning, Layer Object, Properties of STYLE, Dynamic Styles, Inline Styles, Event Handlers; Cascading Style Sheets (CSS): Basic Concepts, Properties, Creating Style Sheets; Common Tasks with CSS: Text, Fonts, Margins, Links, Tables, Colors; Marquee; Mouseovers; Filters and Transitions; Adding Links; Adding Tables; Adding Forms; Adding Image and Sound; Use of CSS in HTML Documents Linking and Embedding of CSS in HTML Document

UNIT – IV

Microsoft FrontPage: Introduction, Features, Title Bar, Menu bar, FrontPage Tool Bar, Style, FontFace and Formatting Bar, Scroll Bars
XML: Introduction, Features, XML Support and Usage, Structure of XML Documents, Structures in XML, Creating Document Type Declarations, Flow Objects, Working with Text and Font, Color and Background Properties;

TEXT BOOKS:

5. Jon Duckett, "Beginning web programming with HTML, XHTML, CSS and JavaScript" – Wiley India Pvt. Ltd.
6. Paul Wilton, "Beginning JavaScript" – Wiley India Pvt. Ltd.
7. Mitchell and Atikinson, "Active Sever Pages" – Techmedia Publishing
8. Adrian Kingsley ,"VB Script Programming Reference" – Wiley India Pvt. Ltd.

REFERENCE BOOKS:

5. Thomas A. Powell, "Web Design: The Complete Reference", 4/e, /Tata McGraw-Hill
6. Deitel and Goldberg, "Internet and World Wide Web", How to Program, PHI.
7. Raj Kamal, "Internet and Web Technologies", Tata McGraw-Hill.
8. Ramesh Bangia, "Multimedia and Web Technology", Firewall Media.
9. Internet and Web Design, ITLESL Research and Development Wing, Macmillan India.

BCA-362: Operating System-II

Maximum Marks: 100 **External: 80**
Minimum Pass Marks: 35 **Internal: 20**
Time: 3 hours

Note: Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

UNIT – I

Process Synchronization: The Critical Section Problem – Single Process/Two Process Solutions; Semaphores – Types, Implementation, Deadlocks and Starvation; Classical Problems of Synchronization – The Bounded Buffer Problem, The Readers and Writers Problem, The Dining-Philosophers Problem, Critical Regions, Monitors

Directory Structure: Single Level, Two Level, Tree Structures, Acyclic Graph, General Graph; Directory Implementation, Recovery

UNIT – II

Secondary Storage Structure: Disk Structure, Disk Scheduling: FCFS, SSTF, SCAN, C-SCAN, LOOK; Selection of Disk Scheduling Algorithm; Disk Management; Swap Space Management

Network Operating Systems: Remote Login, Remote File Transfer;

Distributed Operating System: Data Migration, Computation Migration, Process Migration

UNIT – III

Linux: Introduction, Features, Architecture, Distributions, Accessing Linux System, Login/Logout/Shutting Down, Comparison of Linux with other Operating Systems, Commands in Linux: General-Purpose Commands, File Oriented Commands, Directory Oriented Commands, Communication Oriented Commands, Process Oriented Commands, Redirection of Input and Output, Pipes

UNIT – IV

Linux File System: Types of Files in Linux, File Attributes, Structure of File System, inode, File Permission, File System Components, Standard File System, File System Types, Disk Related Commands

Processes in Linux: Introduction, Job Control in Linux using at, batch, corn & time commands The vi editor: Introduction, Modes of vi Editor, Command in vi Editor

Shell Programming: Introduction, Shell Variables, Shell Keywords, Operators, Assigning Values to the Variables, I/O in Shell, Control Structures, Creating & Executing Shell Programs in Linux.

TEXT BOOKS:

7. Silberschatz A., Galvin P.B.,and Gagne G., "Operating System Concepts", John Wiley & Sons, Inc.,New York.
8. Godbole, A.S., "Operating Systems", Tata McGraw-Hill Publishing Company, New Delhi.
9. Richard Petersen, The Complete Reference – Linux, McGraw-Hill.
10. Yashwant Kanetkar, UNIX & Shell programming – BPB.

REFERENCE BOOKS:

4. Deitel, H.M., "Operating Systems", Addison- Wesley Publishing Company, New York.
5. Tanenbaum, A.S., "Operating System- Design and Implementation", Prentice Hall of India, New Delhi.

- Sumitabha Das, Your UNIX - The Ultimate Guide, Tata McGraw-Hill.

BCA-363: Computer Graphics

Maximum Marks: 100 **External: 80**
Minimum Pass Marks: 35 **Internal: 20**
Time: 3 hours

Note: Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

UNIT – I

Introduction to Computer Graphics; Interactive and Passive Graphics; Applications of Computer Graphics; Display Devices: CRT; Random Scan, Raster Scan, Refresh Rate and Interlacing, Bit Planes, Color Depth, Color Palette, Color CRT Monitor, DVST, Flat-Panel Displays: Plasma Panel, LED, LCD; Lookup Table, Interactive Input Devices, Display Processor, General Purpose Graphics Software, Coordinate Representations;

UNIT – II

Point-Plotting Techniques: Scan Conversion, Scan-Converting a Straight Line: The Symmetrical DDA, The Simple DDA, Bresenham's Line Algorithm; Scan-Converting a Circle: Circle drawing using Polar Coordinates, Bresenham's Circle Algorithm, Scan-Converting an Ellipse: Polynomial Method, Trigonometric Method; Polygon Area Filling: Scan-line Fill and Flood Fill Algorithms;

UNIT – III

Two-Dimensional Graphics Transformation: Basic Transformations: Translation, Rotation, Scaling; Matrix Representations and Homogeneous Coordinates; Other Transformations: Reflection, Shearing; Coordinate Transformations; Composite Transformations; Inverse Transformation; Affine Transformations; Raster Transformation;
Graphical Input: Pointing and Positioning Devices and Techniques

UNIT – IV

Two-Dimensional Viewing: Window and Viewport, 2-D Viewing Transformation
Clipping: Point Clipping; Line Clipping: Cohen-Sutherland Line Clipping Algorithm, Mid-Point Subdivision Line Clipping Algorithm; Polygon Clipping: Sutherland-Hodgman Polygon Clipping Algorithm;
Three-Dimensional Graphics: Three-Dimensional Display Methods; 3-D Transformations: Translation, Rotation, Scaling; Composite Transformations;

TEXT BOOKS:

8. Donald Hearn, M. Pauline Baker, "Computer Graphics", PHI.
9. Apurva A. Desai, "Computer Graphics", PHI, 2010

REFERENCE BOOKS:

8. Newmann & Sproull,"Principles of Interactive Computer Graphics", McGraw Hill.
9. Foley, "Computer Graphics Principles & Practice", Addison Wesley.
10. Rogers, "Procedural Elements of Computer Graphics", McGraw Hill.
11. Zhigang Xiang, Roy Plastock, "Computer Graphics", Tata McGraw Hill.
12. D.P. Mukherjee, "Fundamentals of Computer Graphics and Multimedia", PHI.

BCA-364: Internet Technologies

Maximum Marks: 100 **External: 80**
Minimum Pass Marks: 35 **Internal: 20**
Time: 3 hours

Note: Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

UNIT – I

Internet: Introduction; History; Internet Services; TCP/IP: Architecture, Layers, Protocols; TCP/IP model versus OSI Model; World Wide Web (WWW) - The Client Side, The Server Side, Creating and Searching Information on the Web, Popular Search Engines, URL, HTTP, Web Browsers, Chat & Bulletin Board, USENET & NNTP (Network News Transfer Protocol); Internet vs. Intranet;

UNIT – II

TCP, UDP and IP Protocols, Port Numbers; Format of TCP, UDP and IP; IPv4 addressing; The need for IPv6; IPv6 addressing and packet format; TCP Services; TCP Connection Management; Remote Procedure Call; IP Address Resolution- DNS; Domain Name Space; DNS Mapping; Recursive and Iterative Resolution; Mapping Internet Addresses to Physical Addresses: ARP, RARP, DHCP; ICMP; IGMP;

UNIT – III

Application Layer: Electronic Mail: Architecture; Protocols - SMTP, MIME, POP, IMAP; Web Based Mail; File Access and Transfer: FTP, Anonymous FTP, TFTP, NFS; Remote Login using TELNET; Voice and Video over IP: RTP, RTCP, IP Telephony and Signaling, RSVP;

UNIT – IV

Routing in Internet: RIP, OSPF, BGP; Internet Multicasting; Mobile IP; Private Network Interconnection: Network Address Translation (NAT), Virtual Private Network (VPN); Internet Management and SNMP; Internet Security: E-Mail Security; Web Security; Firewall; Introduction to IPSec and SSL;

TEXT BOOKS

6. Douglas E. Comer, "Internetworking with TCP/IP Volume – I, Principles, Protocols, and Architectures", Fourth Edition, Pearson Education.
7. Andrew S. Tanenbaum, "Computer Networks", Pearson Education.

REFERENCE BOOKS:

(11) Behrouz A Forouzan, "Data Communications and Networking", McGraw Hill.
(12) Michael A. Gallo, William M. Hancock, "Computer Communications and Networking Technologies", CENGAGE Learning.
(13) James F. Kurose, Keith W. Ross, Computer Networking, A Top-Down Approach Featuring the Internet, Pearson Education.
(14) "Introduction to Data Communications and Networking", Wayne Tomasi, Pearson Education.

BCA-365: Advanced Programming with Visual Basic

Maximum Marks: 100 **External: 80**
Minimum Pass Marks: 35 **Internal: 20**
Time: 3 hours

Note: Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

UNIT – I

Collections: Adding, Removing, Counting, Returning Items in a Collection, Processing a Collection; Working with Forms: Form Properties, Creating, Adding, Removing Forms in Project, Adding Multiple Forms, Managing Forms at Run Time, Hiding & Showing Forms, Load & Unload Statements, Drag and Drop Operation**,** Activate & Deactivate events, Form-load event, Example using Forms, Programs in VB using Forms

UNIT – II

Working with Menu: Menu Designing in VB**,** Adding a Menu to a Form, Modifying and Deleting Menu Items, Adding Access Characters, Adding Shortcut Keys, Manipulating Menus using Common Dialog Box, Attaching Code to Events, Creating Submenus, Dynamic Menu Appearance
Advanced Controls in VB: Scroll Bar, Slider Control, Tree View, List View, Rich Text Box Control, Toolbar, Status Bar, Progress Bar, Cool bar, Image List
Program Development in VB using Menus and Advance Controls

UNIT – III

File Handling & File Controls: Sequential & Random files, Opening and Closing Data Files, Viewing the Data in a File, Performing Operations on a File, Creating a Sequential Data File, Writing Data to a Sequential File, Reading the Data in a Sequential File, Finding the End of a Data File, Locating a File, Reading and Writing a Random File (get, put, LOF, seek).
Working with Graphics: Using Paint, Line, Circle, Manipulating
Graphics Program Development in VB using Files and Graphics

UNIT – IV

Accessing Databases: Data Controls, Data-Bound Controls, DAO, RDO, ADO, Creating the Database, Setting Properties, Applying Operations on Database, Viewing the Database, Updating the Database (adding, deleting records)
Program Development in VB using Database and Advance Controls

TEXT BOOKS:

- Steven Holzner, “Visual Basic 6 Programming: Black Book”, Dreamtech Press.
- Evangelos Petroutsos. “Mastering Visual Baisc 6”, BPB Publications.
- Julia Case Bradley & Anita C. Millspaugh, “Programming in Visual Basic 6.0”, Tata McGraw-Hill Edition

REFERENCE BOOKS:

- Michael Halvorson, “Step by Step Microsoft Visual Basic 6.0 Professional”, PHI
- “Visual basic 6 Complete”, BPB Publications.
- Scott Warner, “Teach Yourself Visual basic 6”, Tata McGraw-Hill Edition
- Brian Siler and Jeff Spotts, “Using Visual Basic 6”, Special Edition, PHI.

BCA-366: Programming in Core Java

Maximum Marks: 100

External: 80

Minimum Pass Marks: 35

Internal: 20

Time: 3 hours

Note: Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

UNIT – I

Basic Principles of Object Oriented Programming, Introduction to Java, History and Features of Java, Java Virtual Machine (JVM), Java's Magic Bytecode; The Java Runtime Environment; Basic

Language Elements: Lexical Tokens, Identifiers, Keywords, Literals, Comments, Primitive Data types, Operators, Assignments; Input/output in Java: Basics, I/O Classes, Reading Console Input, Control Structures in Java: Decision and Loop Control Statements

UNIT – II

Class and Object in Java: Defining Class in Java, Creating Objects of a Class, Defining Methods, Argument Passing Mechanism, Using Class and Objects, Constructors, Nested Class, Inner Class, Abstract Class, Dealing with Static Members; Array & String in Java: Defining an Array, Initializing & Accessing Array, Multi –Dimensional Array, Defining String, Operation on Array and String, Creating Strings using String Class, Creating Strings using StringBuffer Class,; Polymorphism in Java: Basic Concept, Types, Overriding vs. Overloading, Implementation

UNIT – III

Extending Classes and Inheritance in Java: Benefits of Inheritance, Types of Inheritance in Java, Access Attributes, Inheriting Data Members and Methods, Role of Constructors in Inheritance, Use of

"super"; Packages & Interfaces: Basic Concepts of Package and Interface, Organizing Classes and

Interfaces in Packages, Defining Package, Adding Classes from a Package to Your Program, CLASSPATH Setting for Packages, Import Package, Naming Convention For Packages , Access Protection in Packages, Standard Packages

UNIT – IV

Exception Handling in Java: The Idea behind Exception, Types of Exception, Use of try, catch, finally, throw, throws in Exception Handling, In-built and User Defined Exceptions, Checked and Un-Checked Exceptions, Catching more than one Exception; Applet in Java: Applet Basics, Applet Architecture, Applet Life Cycle, Applet Tag, Parameters to Applet, Embedding Applets in Web page, Creating Simple Applets; GUI Programming: Designing Graphical User Interfaces in Java, Components and Containers, Using Containers, Layout Managers, AWT Components, AWT Classes, AWT Controls,

TEXT BOOKS:

- Patrick Naughton and Herbert Schlitz,"JAVA-2 Complete Reference" ,TMH, New Delhi.
- Ivor Horton, "Beginning JAVA 2", WROX Publications, New Delhi.

REFERENCE BOOKS:

- "JAVA 2 UNLEASHED", Tech Media Publications, New Delhi.
- E Balaguruswamy,"Programming with Java", TMH, New Delhi.

B.Sc. Computer Science

Programme Outcomes (POs)

PO1	Knowledge	Capable of demonstrating comprehensive disciplinary knowledge gained during course of study
PO2	Communication	Ability to communicate effectively on general and scientific topics with the scientific community and with society at large
PO3	Problem Solving	Capability of applying knowledge to solve scientific and other problems
PO4	Individual and Team Work	Capable to learn and work effectively as an individual, and as a member or leader in diverse teams, in multidisciplinary settings'
PO5	Investigation of Problems	Ability of critical thinking, analytical reasoning and research based knowledge including design of experiments, analysis and interpretation of data to provide conclusions
PO6	Modern Tool usage	Ability to use and learn techniques, skills and moderntools for scientific practices
PO7	Science and Society	Ability to apply reasoning to assess the different issues related to society and the consequent responsibilities relevant to the professional scientific practices
PO8	Life-Long Learning	Aptitude to apply knowledge and skills that are necessary for participating in learning activities throughout the life
PO9	Environment and Sustainability	Ability to design and develop modern systems which are environmentally sensitive and to understand the importance of sustainable development.
PO10	Ethics	Apply ethical principles and professional responsibilities in scientific practices
PO11	Project Management	Ability to demonstrate knowledge and understanding of the scientific principles and apply these to manage projects

Programme Specific Outcomes (PSOs)

PSO1	Students will be able to acquire the basic understanding of the principles and working of the hardware and software aspects of computer systems.
PSO2	Explore technical knowledge in diverse areas of Computer Science and experience an environment conducive in cultivating skills for successful career, entrepreneurship and higher studies.
PSO3	Papers such as C++, JAVA, Python, Web designing give an effective and efficient real time solution in various domains.

SCHEME OF EXAMINATION FOR B.Sc.(COMPUTER SCIENCE) SEMESTER SYSTEM
(Regular Course)
w.e.f. 2014-15
Scheme for B.Sc.-II
Semester-III

Sr. No.		Paper			Exam Duration
			Internal Assessment	External Marks	
1	Paper-I	Data Structures	10	40	3 hrs.
2	Paper-II	Software Engineering	10	40	3 hrs.
Semester- IV					
3	Paper-I	Object Oriented Programming with C++	10	40	3 hrs.
4	Paper-II	Operating System	10	40	3 hrs.
5	Paper-III	Practical Morning Session: (Data Structure implementation using 'C') Evening Session: (Programming with C++)	----	100	6 hrs.(Two Sessions) Morning and Evening
Total(Semester I & II)			40	260	

Internal assessment will be based on the following criteria:
1. Two Handwritten Assignments : 5 marks
2. (Ist Assignment after one month & IInd Assignment after two months)
3. One Class Test : 2.5 marks (one period duration)
4. Attendance : 2.5 marks

NOTE: 1. Practical exam will be conducted annually in two sessions. However the workload will be distributed in both the semesters according to the relevant papers.

B.Sc. Computer Science Semester III

PAPER I: Data Structures

Maximum Marks: 50 **External: 40**
Minimum Pass Marks: 18 **Internal: 10**
Time: 3 hours

Note: Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of six (objective type/short-answer type) questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

UNIT – I

Introduction: Elementary data organization, Data Structure definition, Data type vs. data structure, Categories of data structures, Data structure operations, Applications of data structures, Algorithms complexity and time-space tradeoff, Big-O notation.
Strings: Introduction, strings, String operations, Pattern matching algorithms

UNIT – II

Arrays: Introduction, Linear arrays, Representation of linear array in memory, Traversal, Insertions, Deletion in an array, Multidimensional arrays, Parallel arrays, Sparse matrix.
Linked List: Introduction, Array vs. linked list, Representation of linked lists in memory, Traversal, Insertion, Deletion, Searching in a linked list, Header linked list, Circular linked list, Two-way linked list, Garbage collection, Applications of linked lists. Algorithm of insertion/ deletion in SLL.

UNIT – III

Stack: primitive operation on stack, algorithms for push and pop. Representation of Stack as Linked List and array, Stacks applications : polish notation, recursion. Introduction to queues, Primitive Operations on the Queues, Circular queue, Priority queue, Representation of Queues as Linked List and array, Applications of queue. Algorithm on insertion and deletion in simple queue and circular queue.

UNIT – IV

Trees - Basic Terminology, representation, Binary Trees, Tree Representations using Array & Linked List, Basic operation on Binary tree, Traversal of binary trees:- In order, Preorder & post order, Applications of Binary tree. Algorithm of tree traversal with and without recursion.
Introduction to graphs, Definition, Terminology, Directed, Undirected & Weighted graph, Representation of graphs.

TEXT BOOKS

1. Seymour Lipschutz, "Data Structures", Tata McGraw- Hill Publishing Company Limited, Schaum's Outlines, New Delhi.
2. Yedidyan Langsam, Moshe J. Augenstein, and Aaron M. Tenenbaum, "Data Structures Using C", Pearson Education., New Delhi.

REFERENCE BOOKS

1. Trembley, J.P. And Sorenson P.G., "An Introduction to Data Structures With Applications", Mcgraw- Hill International Student Edition, New York.
2. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", Addison- Wesley, (An Imprint Of Pearson Education), Mexico City.

B.Sc Computer Science Semester III
PAPER II: SOFWTARE ENGINEERING

Maximum Marks: 50 **External: 40**
Minimum Pass Marks: 18 **Internal: 10**
Time: 3 hours

Note: Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

UNIT – I

Introduction: Program vs. Software, Software Engineering, Programming paradigms, Software Crisis – problem and causes, Phases in Software development: Requirement Analysis, Software Design, Coding, Testing, Maintenance, Software Development Process Models: Waterfall, Prototype, Evolutionary and Spiral models, Role of Metrics.

UNIT – II

Feasibility Study, Software Requirement Analysis and Specifications: SRS, Need for SRS, Characteristics of an SRS, Components of an SRS**,** Problem Analysis**,** Information gathering tools, Organising and structuring information, Requirement specification, validation and metrics.

UNIT – III

Structured Analysis and Tools: Data Flow Diagram, Data Dictionary, Decision table, Decision trees, Structured English, Entity-Relationship diagrams .Software Project Planning: Cost estimation: COCOMO model, Project scheduling, Staffing and personnel planning, team structure, Software configuration management, Quality assurance plans, Project monitoring plans, Risk Management.

Unit IV

Software testing strategies: unit testing, integration testing, V and V , System testing, Alpha and Beta testing. Black box, white box testing. Cyclomatic Complexity.
Software Implementation and Maintenance: Type of maintenance**,** Management of Maintenance, Maintenance Process, maintenance characteristics.

TEXT BOOKS:

1. Pressman R. S., "Software Engineering – A Practitioner's Approach", Tata McGraw Hill.
2. Jalote P., "An Integrated approach to Software Engineering", Narosa.

REFERENCE BOOKS:

1. Sommerville, "Software Engineering", Pearson Education.
2. Fairley R., "Software Engineering Concepts", Tata McGraw Hill.

B.Sc Computer Science Semester IV

PAPER I: Object Oriented Programming with C++

Maximum Marks: 50 **External: 40**
Minimum Pass Marks: 18 **Internal: 10**
Time: 3 hours

Note: Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

UNIT – I

Object oriented Programming: Object-Oriented programming features and benefits. Object-Oriented features of C++, Class and Objects, Data Hiding & Encapsulation, Structures, Data members and Member functions, Scope resolution operator and its significance, Static Data Members, Static member functions, Nested and Local Class, Accessing Members of Class and Structure.

UNIT – II

Constructor, Initialization using constructor, types of constructor– Default, Parameterized & Copy Constructors, Constructor overloading, Default Values to Parameters, Destructors, Console I/O: Hierarchy of Console Stream Classes, Unformatted and Formatted I/O Operations.

UNIT – III

Manipulators, Friend Function, Friend Class, Arrays, Array of Objects, Passing and Returning Objects to Functions, String Handling in C++, Dynamic Memory Management: Pointers, new and delete Operator, Array of Pointers to Objects, this Pointer, Passing Parameters to Functions by Reference & pointers.

UNIT – IV

Static Polymorphism: Operators in C++, Precedence and Associativity Rules, Operator Overloading, Unary & Binary Operators Overloading, Function Overloading, Inline Functions, Merits/Demerits of Static Polymorphism.

TEXT BOOKS:

1. Herbert Scildt, C++, The Complete Reference,Tata McGraw-Hill
2. Robert Lafore, Object Oriented Programming in C++, SAMS Publishing

REFERENCE BOOKS:

1. Bjarne Stroustrup, The C++ Programming Language, Pearson Education
2. Balaguruswami, E., Object Oriented Programming In C++, Tata McGraw-Hill.

B.Sc Computer Science Semester IV

PAPER II: Operating System

Maximum Marks: 50 **External: 40**
Minimum Pass Marks: 18 **Internal: 10**
Time: 3 hours

Note: Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

UNIT – I

Introduction: operating system, architecture, functions, characteristics, historical evolution, types: Serial batch, multiprogramming, time sharing, real time, distributed and parallel. OS as resource Manager.

Computer system structures: I/O structure, storage structure, storage hierarchy.

Operating system structure: system components, services, system calls, system programs, system structures.

UNIT – II

Process management: process concepts, process state, process control block, operations, process scheduling, inter process communication.

CPU Scheduling: scheduling criteria, levels of scheduling, scheduling algorithms, multiple processor scheduling. Deadlocks: Characterization, methods of handling, deadlock detection, prevention, avoidance, recovery.

UNIT – III

Storage Management: memory management of single-user and multiuser operating system, partitioning, swapping, paging and segmentation, virtual memory, Page replacement Algorithms, Thrashing.

Process synchronization: critical section problems, semaphores. Mutual exclusion

UNIT – IV

Device and file management: Disk scheduling, Disk structure, Disk management, File Systems: Functions of the system, File access and allocation methods, Directory Systems: Structured Organizations, directory and file protection mechanisms.

TEXT BOOKS:

1. Silberschatz A., Galvin P.B.,and Gagne G., "Operating System Concepts", John Wiley & Sons, Inc.,New York.
2. Godbole, A.S., "Operating Systems", Tata McGraw-Hill Publishing Company, New Delhi.

REFERENCE BOOKS:

1. Deitel, H.M., "Operating Systems", Addison- Wesley Publishing Company, New York.
2. Tanenbaum, A.S., "Operating System- Design and Implementation", Prentice Hall of India, New Delhi.

SCHEME OF EXAMINATION FOR B.Sc. (COMPUTER SCIENCE) SEMESTER SYSTEM (Regular Course) w.e.f. 2015-16

Scheme for B.Sc.-III

Semester-V

Sr. No.		Paper	Internal Assessment	External Marks	Exam Duration
1	Paper-I	Fundamentals of Data Base Systems	10	40	3 hrs.
2	Paper-II	Web Designing	10	40	3 hrs.
		Semester-VI			
3	Paper-I	Relational Data Base Management System	10	40	3 hrs.
4	Paper-II	Computer Networks	10	40	3 hrs.
5	Paper-III	Practical Morning Session: (Web Designing using HTML) Evening Session: (SQL and PL/SQL)	----	100	6 hrs.(Two Sessions) Morning and Evening
Total(Semester I & II)			40	260	

Internal assessment will be based on the following criteria:

1. Two Handwritten Assignments : 5 marks
2. (Ist Assignment after one month & IInd Assignment after two months)
3. One Class Test : 2.5 marks (one period duration)
4. Attendance : 2.5 marks

NOTE: Practical exam will be conducted annually in two sessions. However the workload will be distributed in both the semesters according to the relevant papers.

Paper-I: Fundamentals of Database Systems

Maximum Marks: 50 **External: 40**
Minimum Pass Marks: 18 **Internal: 10**
Time: 3 Hours

Note: Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

UNIT – I

Basic Concepts – Data, Information, Records and files. Traditional file Based Approach-Limitations of Traditional File Based Approach, Database Approach-Characteristics of Database Approach, Database Management System (DBMS), Components of DBMS Environment, DBMS Functions and Components, Advantages and Disadvantages of DBMS.

UNIT – II

Actors on the Scene - Data and Database Administrator, Database Designers, End users Applications Developers and Workers behind the Scene.
Database System Architecture – Three Levels of Architecture, Schemas – External, Conceptual and Internal Level, Database Languages – VDL, DDL, SDL, DML, SQL, Mappings – External/ Conceptual and Conceptual/Internal, Instances, Data Independence – Logical and Physical Data Independence

UNIT – III

Data Models: High Level, Low Level and Representational – Records- based Data Models, Object-based Data Models, Physical Data Models and Conceptual Models
Entity-Relationship Model – Concepts, Entity Types, Entity Sets, Attributes, Relationships, Constraints, Keys , Degree, Cardinality etc.
ER Diagrams of any Database Organization- Inventory System, Payroll System, Reservation System, Online Book Store etc.

UNIT – IV

Classification of Database Management System, Centralized and Client Server architecture
Relational Data Model:-Brief History, Terminology in Relational Data Structure, Relations, Properties of Relations, Keys – Primary, Secondary, Composite, Candidate, Alternate and Foreign Key, Domains, Integrity Constraints over Relations.

TEXT BOOKS:

- Elmasri Ramez & Navathe Shamkant B., “Fundamentals of Database Systems”, Addision & Weisely, New Delhi, 2007
- Date C.J., “Database Systems”, Prentice Hall of India, New Delhi, 2004

REFERENCE BOOKS:

- Korth H.F. & Silverschatz A., “Database Concepts”, Tata McGraw Hill, New Delhi, 2010
- Thomas Connolly Carolyn Begg, “Database Systems”, 3/e, Pearson Education

Paper-II: Web Designing

Maximum Marks: 50 **External: 40**
Minimum Pass Marks: 18 **Internal: 10**
Time: 3 Hours

Note: Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

UNIT – I

Introduction to Internet and World Wide Web; Evolution and History of World Wide Web; Basic Features; Web Browsers; Web Servers; Hypertext Transfer Protocol; URLs; Searching and Web-Casting Techniques; Search Engines and Search Tools

UNIT – II

Steps for Developing Website; Choosing the Contents; Home Page; Domain Names; Internet Service Provider; Planning and Designing Web Site; Creating a Website; Web Publishing: Hosting Site;

UNIT-III

Introduction to HTML; Hypertext and HTML; HTML Document Features;
HTML Tags; Header, Title, Body, Paragraph, Ordered/Unordered Line, Creating Links; Headers; Text Styles; Text Structuring; Text Colors and Background; Formatting Text; Page layouts; Insertion of Text, Movement of Text

UNIT – IV

Images: Types of Images, Insertion of Image, Movement of Image, Ordered and Unordered lists; Inserting Graphics; Table Handling Functions like Columns, Rows, Width, Colours; Frame Creation and Layouts; Working with Forms and Menus; Working with Buttons like Radio, Check Box;

TEXT BOOKS:

- Bayross Ivan, "Web Enabled Commercial Applications Development using HTML, Javascript, DHTML & PHP", BPB Publication, 2005
- Powell Thomas, "The Complete Reference HTML & CSS", Tat Mc-Graw Hill, 2010

REFERENCE BOOKS:

- Wendy Willard, "HTML Beginners Guide", Tata McGraw-Hill
- Deitel and Goldberg, "Internet and World Wide Web, How to Program", PHI.

Paper-I: Relational Data Base Management System

Maximum Marks: 50 **External: 40**
Minimum Pass Marks: 18 **Internal: 10**
Time: 3 Hours

Note: Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

UNIT – I

Relational Model Concepts, Codd's Rules for Relational Model, Hierarchical Data Model– Introduction, Features, Components, Example, Network Data Model– Introduction, Features, Components, Example, Differences between Hierarchical Data Model and Network Data Model
Comparison of Relational Data Model with Hierarchical Data Model and Network Data Model
Relational Algebra:-Selection and Projection, Set Operation, Join and Division.

UNIT – II

Relational Calculus: Tuple Relational Calculus and Domain Relational Calculus.
Functional Dependencies and Normalization -- Purpose, Data Redundancy, Update Anomalies, Partial/Fully Functional Dependencies, Transitive Functional Dependencies, Characteristics of Functional Dependencies, Decomposition and Normal Forms (1NF, 2NF, 3NF & BCNF).

UNIT – III

SQL: Data Definition and data types, Create Table, Insert Data, Viewing Data, Filtering Table Data, Sorting data, Creating Table from a Table, Destroy table, Update, View, Delete, Join, Concatenating data from Table Specifying Constraints in SQL; Primary Key, Foreign Key, Unique Key, Check Constraint, Using Functions

UNIT – IV

PL/SQL-Introduction, Advantages of PL/SQL
The Generic PL/SQL Block: PL/SQL Execution Environment; PL/SQL Character Set and Data Types, Declaration and Assignment of Variables
Control Structure in PL/SQL: Conditional Control, Iterative Control, Sequential Control

TEXT BOOKS:

- Elmasri Ramez & Navathe Shamkant B., “Fundamentals of Database Systems”, Addision & Weisely, New Delhi, 2007
- Bayross Ivan, SQL, PL/SQL, “The Programming Language of Oracle”, BPB Publication, 2002

REFERENCE BOOKS:

- Date C.J., “Database Systems”, Prentice Hall of India, New Delhi, 2004

Paper-II: Computer Networks

Maximum Marks: 50 **External: 40**
Minimum Pass Marks: 18 **Internal: 10**
Time: 3 Hours

Note: Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

UNIT – I

Introduction to Data Communication and Computer Networks; Uses of Computer Networks; Types of Computer Networks and their Topologies; Network Hardware Components: Connectors, Transceivers, Repeaters, Hubs, Network Interface Cards and PC Cards, Bridges, Switches, Routers, Gateways; Network Software: Network Design issues and Protocols; Connection-Oriented and Connectionless Services; OSI Reference Model; TCP/IP Model;

UNIT – II

Analog and Digital Communications Concepts: Analog and Digital data and signals; Bandwidth and Data Rate, Capacity, Baud Rate; Guided and Wireless Transmission Media; Communication Satellites; Switching and Multiplexing; Modems and modulation techniques;

UNIT - III

Data Link Layer Design issues; Error Detection and Correction methods; Sliding Window Protocols: One-bit, Go Back N and Selective Repeat; Media Access Control: ALOHA, Slotted ALOHA, CSMA, Collision free protocols; Introduction to LAN technologies: Ethernet, Switched Ethernet, Fast Ethernet, Gigabit Ethernet; Token Ring; Introduction to Wireless LANs and Bluetooth;

UNIT – IV

Routing Algorithms: Flooding, Shortest Path Routing, Distance Vector Routing; Link State Routing, Hierarchical Routing; Congestion Control; Traffic shaping; Choke packets; Load shedding; Application Layer: Introduction to DNS, E-Mail and WWW services; Network Security Issues: Security attacks; Encryption methods; Firewalls; Digital Signatures;

TEXT BOOKS:

- Andrew S. Tanenbaum, “Computer Networks”, Pearson Education.
- Michael A. Gallo, William M. Hancock, “Computer Communications and Networking Technologies”, CENGAGE Learning.

REFERENCE BOOKS:

- Behrouz A Forouzan, “Data Communications and Networking”, McGraw Hill.
- Bhushan Trivedi, “Computer Networks”, Oxford

DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS
KURUKSHETRA UNIVERSITY, KURUKSHETRA

<table>
<tr><th colspan="4">Session: 2023-24</th></tr>
<tr><th colspan="4">Part A - Introduction</th></tr>
<tr><td>Subject</td><td colspan="3">COMPUTER SCIENCE</td></tr>
<tr><td>Semester</td><td colspan="3">I</td></tr>
<tr><td>Name of the Course</td><td colspan="3">Office and spreadsheet Tools Learning</td></tr>
<tr><td>Course Code</td><td colspan="3">B23-SEC-101</td></tr>
<tr><td>Course Type: (CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/ VAC)</td><td colspan="3">SEC</td></tr>
<tr><td>Level of the course (As per Annexure-I</td><td colspan="3"></td></tr>
<tr><td>Pre-requisite for the course (if any)</td><td colspan="3"></td></tr>
<tr><td>Course Learning Outcomes(CLO):</td><td colspan="3">After completing this course, the learner will be able to:
1. understand the basic concepts of operating systems
2. do the basic editing and formatting in a document
3. create basic spread-sheets for different purposes
4. create basic presentations for different applications
5*. to understand the working of operating system and various office tools practically.</td></tr>
<tr><td rowspan="2">Credits</td><td>Theory</td><td>Practical</td><td>Total</td></tr>
<tr><td>2</td><td>1</td><td>3</td></tr>
<tr><td>Contact Hours</td><td>2</td><td>2</td><td>4</td></tr>
<tr><td colspan="2">Max. Marks:75(50(T)+25(P))
Internal Assessment Marks:20(15(T)+5(P))
End Term Exam Marks: 55(35(T)+20(P))</td><td colspan="2">Time: 3 Hrs.(T), 3Hrs.(P)</td></tr>
<tr><th colspan="4">Part B-Contents of the Course</th></tr>
<tr><td colspan="4"><u>Instructions for Paper- Setter</u>
Examiner will set a total of nine questions. Out of which first question will be compulsory. Remaining eight questions will be set from four unit selecting two questions from each unit. Examination will be of three-hour duration. All questions will carry equal marks. First question will comprise of short answer type questions covering entire syllabus.
Candidate will have to attempt five questions in all, selecting one question from each unit. First question will be compulsory.
Practicum will be evaluated by an external and an internal examiner. Examination will be of three-hour duration.</td></tr>
</table>

Unit	Topics	Contact Hours
I	Operating System - Definition, Functions, Types of Operating System, Basics of Popular Operating Systems, The User Interface, Exploring Computer, Icons, taskbar, desktop, Using Menu and Menu-selection, managing files and folders, Control panel – display properties, add/remove software and hardware, Common utilities.	4
II	Word Processing - Introduction to Word Processing, Menus, Creating, Editing & Formatting Document, Spell Checking, Printing, Views, Tables, Word Art, Mail Merge, Macros, Inserting hyperlinks, Searching for text, Modifying page setup, Applying document themes, Applying document style sets, Inserting headers and footers.	7
III	Spread Sheet: Elements of Electronics Spread Sheet, Applications, Creating and Opening of Spread Sheet, Menus, Manipulation of cells: Enter texts numbers and dates, Cell Height and Widths, Copying of cells, Mathematical, Statistical and Financial function, Drawing different types of charts, Sort and Filter Data.	7
IV	Presentation Software: Creating, Modifying and enhancing a presentation, Type of presentation views, Using sound, Animation, Working with Objects, Printing.	7
V*	Practicum: Operating System: • Starting with basics of Operating Systems and its functionalities Word Processing: • Create and format word documents. • Use tables, word Art and other features in your documents. • Use macros to simplify the tasks in a document. • Use mail merge to write once for many. Spread Sheet: • Use spreadsheet for basic data handling • Apply formulas to sheet for automation. • Use Charts & Shapes for better visualization of the data. • Use sorting and filtering of the data Presentation Software: • Prepare and format presentations. • Apply slide transitions, animations and sequencing for slides. • Apply different formatting and insert options to make presentation better. • Appling sound and animation.	25
Suggested Evaluation Methods		
Internal Assessment: ➢ **Theory** • Class Participation: 4 • Seminar/presentation/assignment/quiz/class test etc.: 4 • Mid-Term Exam: 7		**End Term Examination:** A three hour exam for both theory and

➢ **Practicum** • Class Participation: 2 • Seminar/Demonstration/Viva-voce/Lab records etc.: 3 • Mid-Term Exam: NA	practicum.

Part C-Learning Resources

Recommended Books/e-resources/LMS:

- Help files from Apache Open Office, https://wiki.openoffice.org/wiki/Documentation
- Channelle Andy, "Beginning OpenOffice 3: From Novice to Professional", aPress Publications
- Beginning OpenOffice 3: From Novice to Professional, Andichannele, Apress.
- Microsoft Office 2016 Step by Step: MS Office 2016 Step by Step, By Joan Lambert, Curtis Frye
- Computer Fundamentals - By Pradeep K. Sinha, Priti Sinha, BPB Publications, 6th Edition
- Getting Started with LibreOffice 5.0, Friends of OpenDocuments Inc., Http://friendsofopendocument.com
- Documentation from LibreOffice, https://documentation.libreoffice.org/en/english-documentation/

*Applicable for courses having practical component.