Gondwana University, Gadchiroli

BCA

Model Curriculum for UG Degree in

- **Bachelor in Computer Application (BCA)**
- **Bachelor in Computer Application (Honours) &**
- **Bachelor in Computer Application (Honours with Research)**

IT and Application Board

Program Specific Outcomes:

PSO 01: Students will be able to understand, analyses and develop computer programs in the areas related to algorithm, system software, web design and networking for efficient design of computer-based system.

PSO 02: Apply standard software engineering practices and strategies in software project development using open-source programming environment to deliver a quality of product for business success.

PSO 03: Student will be able to know various issues, latest trends in technology development in the field of AI and thereby, innovate new ideas and solutions to existing problems.

PSO 04: Explore technical knowledge in diverse areas of computer applications and experience an environment conducive in cultivating skills for successful career, entrepreneurship and higher studies.

Important: We have developed our BCA curriculum based on the AICTE model curriculum. However, we recognize that some elements may have been overlooked. For a comprehensive review, please refer to the AICTE BCA curriculum available on their official website to AICTE BCA curriculum
(https://www.aicte-india.org/sites/default/files/Model_Curriculum/BCA%20FINAL(2%20year%20).pdf)

GENERAL COURSE STRUCTURE & CREDIT DISTRIBUTION of

Bachelor in Computer Application (BCA)

GENERAL COURSE STRUCTURE & THEME

A. Definition of Credit:

1 Hr. Lecture (L) per week	1 Credit
1 Hr. Tutorial (T) per week	1 Credit
1 Hr. Practical (P) per week	0.5 Credit
2 Hrs. Practical (P) per week	1 Credit

B. Course Code and definition:

Course Code	Definitions
L	Lecture
T	Tutorial
P	Practical
CC	Core Courses
AEC	Ability Enhancement Courses
MDE	Multi-Disciplinary Elective course
VAC	Value added Courses
SEC	Skill Enhancement courses
DSE	Discipline Specific Elective
OE	Open Elective

Course Name: Bachelor in Computer Application, Bachelor in Computer Application (Honours) and Bachelor in Computer Application (Honours with Research)

Eligibility: A student having a valid CET Score in BCA-CET or any other equivalent CET score and other norms laid down by AICTE/DTE from Time-to-time regarding admission process.

Course Level/Duration/System:

Undergraduate / Three or Four years/6 or 8 Semesters with multiple entry and exit. The following option will be made available to the students joining BCA Research Program:

- One year: Under Graduate Certificate in Computer Application
- Two years: Under Graduate Diploma in Computer Application
- Three years: Bachelor in Computer Application (BCA)
- Four years: Bachelor in Computer Application with Honours: BCA (Honours) or Bachelor in Computer Application Honours with Research: BCA (Honours with Research)

Minimum Eligibility Criteria: Minimum eligibility criteria for opting the course in the fourth year will be as follows:

1. **BCA (Honours with Research):** BCA Degree
2. **For BCA (Honours)**: BCA Degree

Note: The students who are eligible for BCA (Honours with Research) shall have choice to pursue either BCA (Honours) or BCA (Honours with Research).

SEMESTER WISE CREDIT DISTRIBUTION: Semester wise credit distribution of proposed BCA [BCA (Honours) and BCA (Honours with research)] program:

Semester	Core Courses (CC)	Ability Enhancement Courses (AEC)	Multi-Disciplinary Elective Course (MDE)	Value Added Courses (VAC)	Skill Enhancement courses (SEC)	Discipline Specific Elective (DSE)	Total
I	8	4	2	2	6	-	22
II	12	2	-	2	6	-	22
III							22*
IV							22*
V							22*
VI							22*
BCA (Honours)							
VII							
VIII							
BCA (Honours with Research)							
VII							20*
VIII							20*
						Total	172

*A detail distribution of credit Scheme and Syllabus will be displayed Separately on the university portal.

Note: Students can take extra credit course from their own department or from other department as per the Admitting Body / University norms.

Examination: It will be held twice a year as mentioned below.

Sr. No.	Name of the Examination	Examination	Examination
1	BCA –Semester I, III, V, VII (For Honours and Research)	Winter	Summer
2	BCA –Semester II, IV, VI, VIII (For Honours and Research)	Summer	Winter

The examination specified in the preceding paragraph shall be held semester-wise at such places and on such dates as prescribed by the University.

Mapping of Marks to Grades: The mapping of marks to grades may be done as per the following table:

Range of Marks	Assigned Grade
91-100	A^+
81-90	A
71-80	B^+
61-70	B
51-60	C^+
46-50	C
40-45	D
< 40	F (Fail due to less marks)
-	F^R (Fail due to shortage of attendance and therefore, to repeat the course)

Eligibility Criteria for Higher Semester Examinations:

1) The following rules shall be followed when admitting students into the next higher semester for BCA.

Sr. No.	Semester	ATKT/Promotion Rules
1	I	----------
2	II	Students enrolled in **Semester I** shall be allowed to keep the term for **Semester II**, provided they have appeared for at least one paper either theory or practical in the University Examination of Semester I.
3	III	The candidate must pass at least 40% of the total subjects (i.e., 6 papers out of 15, including Practicals) from both **Semester I** and **Semester II** combined.
4	IV	A student enrolled in **Semester III** shall be allowed to keep the term for **Semester IV**, provided they have appeared for at least one paper either theory or practical in the University Examination of Semester III.
5	V	The candidate must have cleared all papers from the first year (i.e., all papers from Semester I and Semester II, including Practicals) and must pass at least 40% of the total subjects including Practicals from both **Semester III** and **Semester IV** combined.
6	VI	Students enrolled in **Semester V** shall be allowed to keep the term for **Semester VI**, provided they have appeared for at least one paper either theory or practical in the University Examination of Semester I.

2) To be eligible for admission to the BCA (Honours) or BCA (Honours with Research) program, a student must have successfully completed a 3-year BCA program.

Language of Examination: The medium of instruction and examination will be English unless otherwise specified in the syllabus, except for Indian or foreign languages selected by students in the AEC course.

INDUCTION PROGRAM

Induction Program aimed at instilling core values and ethics in students, setting a precedent for a holistic educational journey that mirrors global standards. The Essence and Details of Induction program can also be understood from the 'Detailed Guide on Student Induction program', as available on AICTE Portal.
(Link: https://www.aicte-india.org/sites/default/files/Model_Curriculum/BCA%20FINAL(2%20year%20).pdf on Page no. 131, Refer **Appendix III**)

Induction Program (Mandatory)	**Activities**

Induction program for students to be offered right at the start of the first year.	• Physical Activity
	• **Creative Arts**: Painting, Sculpture, Pottery, Music, Dance etc.
	• **Universal Human Values**: Ethics, Rules and Regulation.
	• **Literary**: Debate, Critical Conversation, Analytical Exchange, Reasoned Discourse, etc.
	• **Proficiency Modules**:
	  ○ English Spoken Classes
	  ○ Basic of Information and Communication Technology
	  ○ Basic of Windows
	  ○ PowerPoint Concepts
	  ○ Basic of Internet
	  ○ Basic of Google Drive
	  ○ Intellectual Property Rights and its forms
	  ○ Cyber Crime Law etc.
	• **Lectures by Eminent People**: People who are socially active or in public life.
	• **Visits to Local Areas**: Landmarks of the city, or a hospital or orphanage could be organized.
	• **Familiarization to Department/Branch & Innovations**: Discuss the available facilities, types of events organized, programs, Avishkar, Club, and ongoing research activities.

Mandatory Visits / Workshop/ Expert Lectures:

- It is mandatory to arrange one industrial visit every semester for the students.
- It is mandatory to conduct a One-week workshop during the winter break after fifth semester on Professional/ Industry/ Entrepreneurial orientation.
- It is mandatory to organize at least one expert lecture per semester by inviting resource persons from domain specific industry.

Semester wise Structure and Curriculum for UG Course in

Bachelor in Computer Application (BCA)

SEMESTER I

Sr. No.	Course Code	Course Title	L	T	P	Credit	% of Assessment				
							University Assessment (UA)	College Assessment (CA)	Total (UA+CA)	Min. Passing (UA+CA)	
										(%)	Marks
1	CC101	Mathematics Foundations to Computer Science	3	0	0	3	60	15	75	40%	30
2	CC102	Basic of Computer Architecture	3	0	0	3	60	15	75	40%	30
		Lab	0	0	4	2	30	20	50	50%	25
3	SEC101	Problem Solving Techniques	3	0	0	3	60	15	75	40%	30
		Lab	0	0	4	2	30	20	50	50%	25
4	AEC101	General English – Soft Skills	1	1	0	2	40	10	50	40%	20
5	MDE101	Indian Knowledge System[1]	2	0	0	2	40	10	50	40%	20
6	VAC101	Environmental Science and sustainability	2	0	0	2	-	50	50	50%	25
7	AEC102	**Elective:** Additional Course[2] – Indian or Foreign Language	1	1	0	2	-	50	50	50%	25
8	SEC102	Seminar	1	-	-	1	-	25	25	50%	13
Total			**16**	**2**	**8**	**22**	**320**	**230**	**550**		
Note: For University Assessment (UA), College Assessment (CA) Evaluation Rules, Practical Assessment and for Question Paper Pattern refer Appendix 2 to 4											

Note: 1. **Indian Knowledge System**: Indian Culture and Civilization Indian Vision for Human Society Indian Science Indian Town Planning and Architecture Indian Mathematics and Astronomy Indian Aesthetics Indian Health, In IT sector, Wellness.

2. **Additional Course**: Hindi or
   If a student selects another reginal Indian or foreign language: Student must complete this language course on Swayam or NPTEL and submit the necessary documentation/result before the start of university exam.

Bachelor in Computer Application (BCA)

SEMESTER II

Sr. No.	Course Code	Course Title	L	T	P	Credit	% of Assessment				
							UA	CA	Total (UA+CA)	Min. Passing (UA+CA)	
										(%)	Marks
1	CC103	Operating System & Linux	3	0	0	3	60	15	75	40%	30
2	CC104	Programming in 'C'	3	0		3	60	15	75	40%	30
		Lab	0	0	4	2	30	20	50	50%	25
3	CC105	Database Management System	3	0	0	3	60	15	75	40%	30
		Lab	0	0	2	1	15	10	25	50%	13
4	SEC103	E-Commerce and Web Design	3	0	0	3	60	15	75	40%	30
		Lab	0	0	4	2	30	20	50	50%	25
5	VAC102	Indian Constitution	2	0	0	2	-	50	50	50%	25
6	AEC103	**Elective:** Additional Course[1] - Indian or Foreign Language	1	1	0	2	40	10	50	50%	25
7	SEC104	Seminar	1	-	0	1	-	25	25	50%	13
Total			**16**	**1**	**10**	**22**	**355**	**195**	**550**		

Note 1: Indian Languages: Hindi

If a student selects another reginal Indian or foreign language: Student must complete this language course on Swayam or NPTEL and submit the necessary documentation/result before the start of university exam.

After Year 1, Students are advised to take Social Responsibility & Community Engagement - encompassing Community Engagement with an NGO in the vacation time.

An UNDER GRADUATE CERTIFICATE IN COMPUTER APPLICATION will be awarded, if a student wishes to exit at the end of First year. Exit Criteria after First Year of BCA Programme

Students will have the option to exit the Bachelor of Computer Application (BCA) program after successfully completing the first year. Upon exit, they will be awarded a **UG Certificate in Computer Application**. To be eligible for this certificate, students must complete an additional 04 credits in one of the following areas:

1. **Skill-Based Subject**: A course designed to enhance practical and technical skills in the field of computer applications.
2. **Work-Based Vocational Course**: A vocational course offered during the summer term that emphasizes hands-on training and workplace readiness.
3. **Internship/Apprenticeship**: A professional internship or apprenticeship program in a relevant field, with a minimum duration of 08 weeks, which will take place after the second semester.
4. **Social Responsibility & Community Engagement**: Active engagement with an NGO or community organization for a minimum duration of 08 weeks, focusing on real-world problem-solving, social responsibility, and community service.

The mode and specifics of these additional credits can be earn as decided by college and students will be required to complete the 08-week program during the summer term following their second semester.

The exiting students will clear the subject / submit the Internship Report as per the University schedule.

Re-entry Criteria in to Second Year (Third Semester)

The student who takes an exit after one year with an award of certificate may be allowed to re-enter in to Third Semester for completion of the BCA Program as per the respective College/University /Admitting Body schedule after earning requisite credits in the First year.

Bachelor in Computer Application (BCA)

SEMESTER III

Scheme and Syllabus will be displayed Separately on the university portal.

In this Sem, student will opt Discipline-Specific Electives [DSE] - Data Science / Artificial Intelligence and Machine Learning / Full Stack Development proposed by College/Universities as indicated at the **Appendix – 1***

***Additional DSE if any will be notified Separately on the University portal.**

SEMESTER IV

Scheme and Syllabus will be displayed Separately on the university portal.

- Note: 1. At the end of the Fourth Semester every student shall undergo Summer Training / Internship / Capstone for Eight Weeks in the Industry/Research or Academic Institute. This component will be evaluated during the fifth semester.
- An UNDER GRADUATE DIPLOMA IN COMPUTER APPLICATION will be awarded, if a student wishes to exit at the end of Second year.

Exit Criteria after Second Year of BCA Programme

Students will have the option to exit the Bachelor of Computer Application (BCA) program after successfully completing the second year. Upon exit, they will be awarded a **UG Diploma in Computer Application**. To be eligible for this diploma, students must complete an additional 04 credits in one of the following areas:

- **Skill-Based Subject**: A specialized course aimed at enhancing technical and practical expertise in computer applications.
- **Work-Based Vocational Course**: A vocational course offered during the summer term, focused on building practical, industry-relevant skills.
- **Internship/Apprenticeship**: A professional internship or apprenticeship with a minimum duration of 08 weeks, conducted after the fourth semester, offering hands-on experience in a relevant field.
- **Social Responsibility & Community Engagement**: Involvement with an NGO or community-based organization for a minimum of 08 weeks, contributing to social initiatives and applying computer application knowledge to solve real-world challenges.

- **Capstone Project**: Completion of a capstone project integrating the skills and knowledge gained during the first two years of the program, which can be an independent or group project.

The specific mode of completing the additional credits will be decided by the respective **University/Admitting Body**, and students will be required to complete the 08-week program or project during the summer term following their fourth semester.

Students opting for this exit will also be required to **submit an Internship/Apprenticeship Report** or complete the Capstone Project as per the schedule outlined by the University/Admitting Body before they are awarded the UG Diploma.

Re-entry Criteria in to Third Year (Fifth Semester)

The student who takes an exit after second year with an award of Diploma may be allowed to re-enter into fifth Semester for completion of the BCA Program as per the respective University / Admitting Body schedule after earning requisite credits in the Second year.

Bachelor in Computer Application (BCA)

SEMESTER V

Scheme and Syllabus will be displayed Separately on the university portal.

SEMESTER VI

Scheme and Syllabus will be displayed Separately on the university portal.

- BACHELOR IN COMPUTER APPLICATION Degree will be awarded, if a student wishes to exit at the end of Third year.

Exit Criteria after Third Year of BCA Programme

The students shall have an option to exit after 3rd year of Computer Application Program and will be awarded with a Bachelor's in Computer Application.

Re-entry Criteria in to Fourth Year (Seventh Semester)

The student who takes an exit after third year with an award of BCA may be allowed to re-enter in to Seventh Semester for completion of the BCA (Honours) or BCA (Honours with Research) Program as per the respective University / Admitting Body schedule after earning requisite credits in the Third year.

Minimum eligibility criteria for opting the course in the fourth year will be as follows:

1. **BCA (Honours with Research):** BCA Degree
2. **For BCA (Honours)**: BCA Degree

SEMESTER VII - (BCA (Honours)

Specialization – AI & ML

Scheme and Syllabus will be displayed Separately on the university portal

SEMESTER VII - (BCA (Honours)

Specialization – Data Science

Scheme and Syllabus will be displayed Separately on the university portal

SEMESTER VIII - (BCA (Honours)

Scheme and Syllabus will be displayed Separately on the university portal

SEMESTER VII - (BCA – (Honours with Research)

Scheme and Syllabus will be displayed Separately on the university portal

SEMESTER VIII- (BCA –(Honours with Research)

Scheme and Syllabus will be displayed Separately on the university portal

***The Dissertation work will start from the beginning of fourth year of BCA (Honours with Research) Program.**

Students of Fourth Year shall be assessed for Project Work and Research Internship Report and Viva –Voce and Dissertation (For Research Track).

Bachelor in Computer Application (BCA)

SEMESTER – I

Bachelor in Computer Application (BCA)

SEMESTER I

Sr. No.	Course Code	Course Title	L	T	P	Credit	% of Assessment				
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4	AEC101	General English – Soft Skills	1	1	0	2	40	10	50	40%	20
5	MDE101	Indian Knowledge System[1]	2	0	0	2	40	10	50	40%	20
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7	AEC102	Additional Course[2] – Indian or Foreign Language	1	1	0	2	-	50	50	50%	25
8	SEC102	Seminar	1	-	-	1	-	25	25	50%	13
Total			**16**	**2**	**8**	**22**	**320**	**230**	**550**		
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- **Note 2: Indian Languages**: Hindi or

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MATHEMATICS FOUNDATION TO COMPUTER SCIENCE

Semester 1 CC101	Paper 1: Mathematics Foundation to Computer Science	3L:0T:0P	03 Credits 75 Marks (60 UA + 15 UA)

COURSE OUTCOMES

CO1: Provide a basic understanding of fundamental mathematical concepts such as sets, functions, matrix algebra, and discrete mathematics.

CO2: This course enables the students to use mathematical models and techniques to analyze and understand problems in computer science.

CO3: This course demonstrates how the mathematical principles give succinct abstraction of computer science problems and help them to efficiently analyze.

COURSE CONTENTS

UNIT - I: SETS AND LOGIC

Fundamental: -Sets and subsets, Operations on sets, Sequences, Division in the Integers, Matrices, Mathematical structures.

Logic: Proposition and Logical operations, Conditional Statements, Mathematical Induction.

UNIT - II: MATHEMATICAL LOGIC

Statement and Notation, Connectives, Duality Law, Normal forms, The theory of inference for the statement calculus, The predicate calculus.

UNIT - III: COUNTING, RELATIONS, AND DIGRAPHS

Counting- Permutations, Combinations, The pigeonhole principle, Recurrences religions.

Relations and Digraphs: Products sets and partitions, Relations and Digraphs, Paths in relations and digraphs.

Properties of relations, Equivalence relations, Computer representation of relations and digraphs, Manipulation of relations, Transitive Closure, and Warshall's algorithm.

UNIT - IV: SEMIGROUPS AND GROUPS

Semigroups and Groups: Binary operation revisited, Semigroups, Products, and Quotients of semigroups,Groups, Products and quotients of groups.

BOOKS:

1. J.P. Tremblay and R. Manohar, "Discrete Mathematical Structure with Applications to Computer Science", TMH, ISBN- 0-07-463113-6
2. Bernard Kolman, Robert C. Busby and Sharon Ross, "Discrete Mathematical Structure", PHI, ISBN- 978-81-203-3689-6
3. Dr. S. B. Kishor, K. Azmi, Dr. M. Singh, "Discreate Mathematics", Das Ganu, ISBN 978-93-81660-21-8

REFERENCES:

1. E. Goodaire, "Discrete Mathematics with Graph theory", PHI, ISBN: 10: 0131679953
2. J. K. Sharma, "Discrete Mathematics", McMillan, ISBN:9780230322301

Web Resources

1. https://nptel.ac.in/courses/106103205
2. https://nptel.ac.in/courses/111101115

BASIC OF COMPUTER ARCHITECTURE

Semester I CC102	Paper 2: Basic of Computer Architecture	3L:0T:0P	03 Credits 75 Marks (60 UA + 15 CA)

COURSE OUTCOMES

- CO1: To Understand the basics of Digital Electronics and Binary Number System
- CO2: To Learn the implementation of Combinational Circuit.
- CO3: To Learn the implementation of Sequential Circuit.
- CO4: Realize and simplify Boolean Algebraic assignments for designing digital circuits using K-Maps and Design and implement Sequential and Combinational digital circuits as per the specifications.

COURSE CONTENTS

UNIT - I: NUMBER SYSTEM AND DATA REPRESENTATION

Number System: Binary, Octal, Decimal, and Hexadecimal Number System and their Inter Conversion. Binary Codes: BCD, Excess3, Parity, Gray, ASCII, EBCDIC Codes and their advantages and disadvantages. Data Representation: Positive, Negative, Maximum and Minimum Number Representation (Related to 8-bit Number), Real Number Representation, Underflow, Overflow, Range, and Accuracy.

UNIT – II: BINARY ARITHMETIC & LOGIC GATES

Binary Arithmetic: Binary Addition, Decimal Subtraction Using 9's and 10's Complement, Binary Subtraction Using 1's and 2's Complement Multiplication and Division. Logic Gates: Truth Table, Properties and Symbolic Representation of NOT, AND, OR, NOR, NAND, EX-OR, EX-NOR Gates. NOR and NAND Gates as Universal Gates.

UNIT – III: BOOLEAN ALGEBRA AND COMBINATIONAL CIRCUITS

Boolean Algebra: Laws and Identities of Boolean Algebra, Demorgan's Theorem, Use of Boolean Algebra for Simplification of Logic Expression, K-Map for 2, 3, 4 Variables, Simplification of SOP and POS Logic Expression Using-Map. Combinational Circuits: Half Adder, Full Adder, Half Subtractor, Full Subtractor, 4-Bit Binary Adder Subtractor, Multiplexer, DE multiplexer, Decoder, Encoder.

UNIT – IV: SEQUENTIAL CIRCUITS AND COUNTERS

Sequential Circuits: Flip-Flops Construction and Working of RSFF, DFF, TFF, JKFF and JKMSFF.
Counters: Construction and Working of Asynchronous, Synchronous, Up-Down Counter, Shift Registers and Their Types, Ring Counter, Johnson Counter with their Time Diagram.

BOOKS:

1. Gothman, "Digital Electronics", PHI.
2. Navaneeth, Kale and Gokhale, "Digital and Analog Technique", ISBN-81-225-0153-2

REFERENCES:

1. Soumitra Mandal, "DigitalElectronics", TMH, ISBN0-07015382-5
2. Bram, "Fundamental of Microprocessor and Microcomputer", Dhanpat Rai Pub.
3. Liu.Gibson, "Microcomputer System: The8086/8088 Family", ISBN-1-55623-874-6

LAB

Semester I CC102	**LAB**	**0L:0T:4P**	**02 Credits 50 Marks (30 UA +20 CA)**

Laboratory Experiments:

UNIT II

Case Study 1: Logic Control System for Automation

Problem: A factory automation system needs to control machines based on certain conditions. To design the control logic, the engineers need to understand and design basic logic gates (AND, OR, NOT) to implement the necessary control functions.

Objective: Study and design the characteristics of basic gates (AND, OR, NOT) to create control circuits that can automate factory operations based on different input signals.

Case Study 2: Smart Home Security System Design

Problem: A smart home security system requires combinations of universal gates (NAND, NOR) to implement fail-safe mechanisms. The system should be able to function even if one part fails.

Objective: Study and design the characteristics of universal gates (NAND, NOR) to implement robust security logic that ensures the system remains operational under different conditions.

Case Study 3: Advanced Digital Lock System

Problem: To enhance security, a digital lock system uses derived gates (EX-OR, EX-NOR) for data encryption and error detection. Understanding these gates is crucial for implementing the locking mechanism.

Objective: Study and design the characteristics of derived gates (EX-OR, EX-NOR) for implementing secure and reliable digital lock systems.

Case Study 4: Optimized Circuit Design for Cost Reduction

Problem: In an effort to reduce manufacturing costs, a company wants to design basic gates (AND, OR, NOT) using a single type of universal gate (NAND). This simplifies the production process.

Objective: Study and design basic gates using Universal NAND gates to create cost-effective and optimized circuit designs.

Case Study 5: Space-Efficient Circuitry for Embedded Systems

Problem: Embedded systems in compact devices require efficient use of space and components. Using a universal NOR gate to design basic gates (AND, OR, NOT) can reduce the number of components and save space.

Objective: Study and design basic gates using Universal NOR gates to develop compact and efficient embedded system designs.

Case Study 6: Error Detection Mechanism in Communication Systems

Problem: A communication system requires reliable data transmission with built-in error detection. Derived gates (EX-OR, EX-NOR) using NAND gates can be used for this purpose.

Objective: Study and design EX-OR and EX-NOR gates using Universal NAND gates to implement error detection in communication systems.

Case Study 7: Redundant System Design for Critical Applications

Problem: Critical applications such as hospital equipment need redundant systems to ensure uninterrupted operation. Designing derived gates (EX-OR, EX-NOR) using NOR gates can help in building fail-safe circuits.

Objective: Study and design EX-OR and EX-NOR gates using Universal NOR gates to ensure redundancy and reliability in critical systems.

Case Study 8: Logic Conversion for Interchangeable System Parts

Problem: In multi-purpose devices, there is a need to interchangeably use different logic configurations. Converting NOR gates to NAND gates allows flexibility in such systems.

Objective: Study and design NOR gates using NAND gates to allow interchangeability and flexible use of system components.

Case Study 9: Multi-function Device Design

Problem: Devices that need to switch between different logic operations require the ability to convert NAND gates to NOR gates. This conversion simplifies the design of multi-function devices.

Objective: Study and design NAND gates using NOR gates to enable multi-functional design in electronic devices.

UNIT III

Case Study 10: Digital Calculator Design (Half-Adder)

Problem: Digital calculators require the ability to perform simple binary addition. Half-Adders are used in the basic design of calculator circuits.

Objective: Study and design a Half-Adder circuit to understand how simple binary addition is implemented in digital calculators.

Case Study 11: Multi-bit Binary Addition in Computers (Full-Adder)

Problem: Computers require Full-Adders to perform multi-bit binary addition, a fundamental operation in CPUs. Understanding Full-Adders is essential for digital circuit design.

Objective: Study and design a Full-Adder circuit to implement multi-bit addition operations in computer processors.

Case Study 12: Simple Digital Subtraction Device (Half Subtractor)

Problem: Small digital devices need to perform subtraction operations. Designing a Half-Subtractor allows for efficient and straightforward binary subtraction.

Objective: Study and design a Half Subtractor circuit to understand how simple binary subtraction is implemented in digital devices.

UNIT IV

Case Study 13: Memory Storage Device Design (RS Flip-Flop)

Problem: Memory storage and control systems often use RS flip-flops designed with NAND gates to store single bits of data. Understanding these circuits is essential for developing robust memory systems.

Objective: Study and design RS Flip-Flop using NAND gates for use in memory and control systems.

Case Study 14: Power Backup System for Critical Infrastructure

Problem: Power backup systems need stable memory control. Designing RS flip-flops using NOR gates provides stable and consistent logic for these critical applications.

Objective: Study and design RS Flip-Flop using NOR gates to ensure stable memory operations in backup power systems.

Case Study 15: Synchronous Data Transfer in Communication Systems

Problem: Synchronous data transfer systems use JK Flip-Flops for data timing and control. Designing these circuits helps in achieving precise timing in communication devices.

Objective: Study and design JK Flip-Flops for accurate timing and control in synchronous data communication systems.

Case Study 16: Advanced Sequential Logic Control (JKMS Flip-Flop)

Problem: Sequential logic control is needed in devices like traffic lights and automatic machinery. Designing JKMS Flip-Flops enables more advanced control mechanisms.

Objective: Study and design JKMS Flip-Flops for sequential logic control in automated systems.

Hardware

1. Familiarize the computer system layout: marking positions of SMPS, motherboard, HDD, CD, and add on cards.
2. Identify the Computer Name and Hardware Specification (RAM capacity, Processor type, HDD, 32 bit/ 64 bit / 128 bit)
3. Identify and Troubleshoot the problems of RAM, SMPS and motherboard
4. Configure BIOS settings- disable and enable USB and LAN
5. Adding additional RAM to the system. (expanding RAM size).
6. To Study mother board layout of a system.
7. Demonstrate the assembly of a PC
8. Demonstration of various ports: VGA port, PS/2 (keyboard, mouse), USB, LAN, Speaker, Audio.
9. Install and configure Windows OS
10. To study the input and output devices & trouble shooting.

Assignment:

Note down various PC/Laptop configurations currently available in the market, focusing on the following areas and their significance:

- General Students
- Civil Engineering/Architecture
- Interior/Graphics Designer
- Gaming Console
- Office

PROBLEM SOLVING TECHNIQUES

Semester I SEC101	Paper 3: Problem Solving Techniques	3L:0T:0P	03 Credits 75 Marks (60 UA + 15 UA)

COURSE OUTCOMES

- C01: Understand the evolution of programming languages, including machine language, assembly language, and high-level language.
- C02: Understand the types of algorithms, algorithm analysis, and the advantages and disadvantages of using algorithms.
- C03: Recognize the role of data types, constants, and variables in programming.
- C04: Understand the concept of arrays and their applications in programming.

Prerequisite: This is an introductory programming course and hence no prerequisites

COURSE CONTENTS

UNIT - I: LANGUAGE EVOLUTION

Machine Language, Assembly Language, High-Level Language. Translators: Compiler, Interpreter, and Assembler. The Compilation Process, Linker, Loader, Study of Programming Languages (Function Oriented, Object-Based, Event Base), Study of HLL, Characteristics of Good Language

UNIT - II: PROGRAMMING CONSTRUCTION TOOLS

Problem Analysis, Process Analysis, Conceptual Development of Solution. Development Tools: **Algorithm:** Types of Algorithm, Algorithm of Analysis, Advantage and Disadvantage of Algorithm, Complexity of Algorithm, Big-O Notation. **Flowcharts:** Types of Flowcharts, Advantage and Disadvantage of Flowchart, Pseudocode

UNIT - III: CONTROL STATEMENTS

Basics of Programming Language: Usage of Character Set, Meaning of Keywords and Identifiers, Role of Data Types, Constants, and Variables. Importance of Casting, Different Types of Operators and their Precedence, Expressions, Conditional Statements (One-Way, Two-Way, and Multi-Way Conditional), Looping Statements (for, while, do-while), Usage of exit(), continue, break, and goto Statement.

UNIT - IV: ARRAYS

Arrays: Arrays, One-dimensional arrays, Various Operations on an Array (Inserting of Element, Deleting of Element) and Two-dimensional arrays (Matrix Addition, Transpose of Matrix, Matrix Multiplication), Modular programming and its features.

BOOKS:

1. Dr. Ajay S. Kushwaha, Dr. Rajani D. Singh, Dr. Venugopal N., Dr. M. Quadri, "Developing Programming Logic and Technique", Das Ganu Prakashan
2. Maureen Sprankle, "Problem Solving Programming Concepts", Pearson, 7th Edition, 2009 ISBN 81-317-0711-1
3. Behrouz Forouzan, "Basic of Computer Science", Cengage Leaning, ISBN 81-315- 1118-9

REFERENCES:

1. Donald Knuth," The Art of Computer Programming Vol-I, II III", Pearson.
2. Horowitz, Sahani, "Fundamental of Computer Algorithm", Orient Longman, ISBN 978817371612

LAB

Semester I SEC101	LAB	0L:0T:4P	02 Credits 50 Marks (30 UA+ 20 CA)

Perform the Following Practical Questions in lab, Write the steps for each and put the screenshots in Practical record. Practical Should be Perform Using Libre Office Writer/MS-Word.

1. Type the Content Heading and then set the Index option using Tab setting. Finally take aprint out.

CONTENTS

Chapter **Page No.**

[Chapter names at 1" with left alignment while Page number at 4.5" with right alignment and with Header]

2) Draw a Block diagram of computer system using auto-shapes. and name them using textbox and join each part using line-style.

At the end give the page border to it.

Finally take a print out.

3) Type the following set of equation using Equation and Symbols. Finally take a printout.

1. $B^2-4AC=0$
2. H_2SO_4
3. If $(A^2 \geq 0)$
4. $f(x) = \sum_{i=1}^{i=5} 5 * Xi$
5. $K^2-4=0$, if $b_0 \neq 0$
6. $e^{i\Theta}+e^{-i\Theta}= 2COS\Theta$
7. $\iint_D f(x,y)dA$
8. $$r = \frac{\sum(x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum(x_i - \bar{x})^2 \sum(y_i - \bar{y})^2}}$$
9. $$\sigma^2 = \frac{1}{n}\sum_{i=1}^{n}(x_i - \bar{x})^2$$
10. $$\bar{x} \pm z\frac{\sigma}{\sqrt{n}}$$
11. $$\sigma = \sqrt{\frac{1}{n}\sum_{i=1}^{n}(x_i - \bar{x})^2}$$

4) Type the following letter and take printout

ABC
SAI Nagar
Mumbai
✆020-1111111

Dear Sir,

Kindly provide the **rate** of following set of peripherals,

a.
   i. Computer 🖳 with following configuration
   ii. Intel© Pentium© Processor T4400 (2.2 Ghz, 1MB L2 Cache, 800 MHz FSB)
   iii. 250 GB HDD, DVD RW, 35.56cms (14) CSV LED Backlit, 1GB DDR3 RAM

b. Pen drive of 64 GB and 128 GB

c. 3-Button mouse 🖱 of following 5 each
   a) i-ball
   b) Logitech

Thanking you,

Date: < Insert System Date > Your
XYZ

5) Type the following

LibreOffice

1. Word
2. Excel
3. Power Point
4. Access

a) **Ms-Word:** MS-Word is the application software and one of the most powerful word processor in Windows operating system. It is used for formatting of letters or the text. In simple meaning it is a word processor having various functions for text you may insert different objects like pictures, sound and video or calendar in word file.

b) **Ms-Excel:** Ms-Excel is a powerful spreadsheet or worksheet application that can use for managing, analyzing and presenting data in tabular format. It also helps to display data in graphical format using charts.

c) **Ms-Power Point**: MS PowerPoint is a powerful tool to create professional looking presentation and slide shows.

d) **Ms-Access**: Ms-Access is a powerful program to create and manage database.

Perform the following operation,

i. When user presses on Access it should jump to Access Paragraph within page.
ii. Similarly create a hyperlink for other option within a page.I
iii. Print it.

6) Define and write the characteristic of computer and perform following operation,
   a. Divide the text in two columns
   b. Insert the picture of computer in the background in each column.
   c. Insert header with your name
   d. In footer write name of your college
   e. Give proper heading for phrase.
   f. Use Drop Cap for 1st letter of each paragraph
   g. Define line spacing 1.5 with left margin 1.25" and right margin 0.75"
   h. Font: Courier New, Font size for heading 14 and for normal text 11
   i. Finally save the file into PDF format.

7) Type the following letter exactly as given below,
   Before start of typing, set up page in the following format
   1) Page Size: A4 with Landscape Orientation
   2) Left Margin: 2" Right Margin: 1" Top Margin: 0.5"
   3) Note down the type of bullet used.

Computer Stream after 12th

COMPUTER

- **Science Stream**
  - **B.Sc. (Computer Science)**
  - **B.Sc. (IT)**
  - **BCA**
  - **MCA**
  - **M.Sc. (Computer Science)**
- **Commerce Stream**
  - **BCCA**
  - **MCM**

[If the computer picture is not loaded on your device, simply select one of the images available in the clip art.]

8) Write a letter to publisher for supplying the list of books along with book details. For ex.

To,
The Publisher,
Das Ganu Prakashan,
Nagpur.

R/Sir,

Kindly supply the following title of books at the earliest.

Sr. No.	Title	Author	No. of Copies
	Information System	S. Kishor	10
	Information Technology	S. Kishor	15
	Principle of Business Management	S. Kishor	12

	Financial Accounting	Dr. Kishor Mohrir	13

Thanking you,

Date: < Insert System Date >

Yours

Principal
(Dr. WWW)

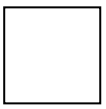
Perform Following Option

i. Generate Sr. No. automatically.
ii. Assume Liberian forget to enter one of the entries of book so, kindly add it between number 3 and 4 say,

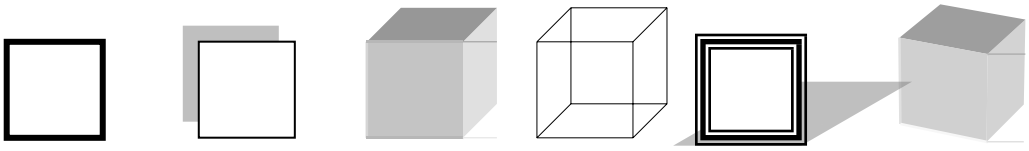
4 Business Economics Gurbir Kaur Khalsa

iii. Replace author name S. Kishor by Dr. S. B. Kishor at once.
iv. Move Information technology book at the top using shortcuts keys.
v. Finally print the copy of this document with following settings,
   - Left Margin = 1.75”
   - Right Margin = 1”
   - Top Margin = 1.5”
   - Bottom Margin = 1”

9) Using Mail-Merge write a letter to all selected candidate for their final admission on specific datesay (30-June) at XYZ Institute, with necessary documents at 10 AM.
Name should be highlighted while course and date of commencing class should be underlined
10) Create a document and while saving give a security to open the saved document.Take a screen shot while opening it.
11) Draw the following shape using rectangle option found in Drawing Toolbar



And generate following types of box by copying and formatting above box



Practical 12:

- Generate three paragraphs of random text using the =rand() function with different parameters.
- Insert three different types of horizontal lines in your document using the keyboard method.

Practical 13:

- Create a list of items in serial order starting from 1 then change the numbering to start from 21 using the "Start at" numbering feature.
- Set the page numbering to start from 5 instead of 1.

Practical 14:

- Create a custom style named "MyStyle" with Times New Roman font, size 14, bold, and center-aligned.
- Assign a shortcut key to this style.

Practical 15:

- Create a two-page document where the first page is in portrait orientation and the second page is in landscape orientation.
- Insert a picture inside an oval shape and format it with a border and shadow effect.

Practical 16:

- Create a document with three paragraphs to add text in various locations on a blank page without using the Enter or Space keys. Use the Voice Typing feature to dictate the content of the second paragraph.
- Apply Auto Suggestion Spell to your document and demonstrate how it works while typing a paragraph with intentional spelling errors.

Practical 17:

- Generate an OMR sheet for a 10-question multiple-choice quiz using special characters.

Practical 18:

- Perform a calculation within your document: multiply 23 by 17 and display the result using the Quick Parts feature.

- Create a list of 5 monetary values in numbers. Convert these numbers into their text equivalents using the CardText field code.

Practical 19:

- Create a table with 4 columns and 5 rows. Convert this table into text and then back into a table.
- Create a table with book details (Book Title, Author, Quantity, Price). Use Word's table calculation feature to calculate the total cost for each book and the grand total with total books and price.
- Add a new column Sr no. at the start and generate serial number automatically
- Give a heading to table say **Library Books** by adding a new row at the top and merged all the columns.
- Split a table into two separate tables, then merge them back together.

Practical 20:

- Insert the following symbols in your document: ₹, ॐ, →, ←, ☜, ✡. Use shortcut keys for each.
- Add a watermark to each page with a text, <Your Name>.

Practical 21: Use the cross-reference feature in MS Word to:

- Insert a cross-reference to a bookmark.
- Insert a cross-reference to a page number.
- Insert a cross-reference to a heading.

Practical 22:

- Create a suitable resume format and save it as a template for future use.
- Translate a short English paragraph into Hindi using Word's built-in translation feature.

Practical 23:

- Copy and paste a text from a website. Use the Clear Formatting feature to remove all formatting from the pasted text.
- Copy and Paste directly few sections without copying text of the under each section into another document.

CASE STUDIES

Case Study 1: Creating a Formal Letter

- **Objective:** Create a formal letter with proper formatting, including letterhead, date, recipient address, salutation, body, closing, and signature.
- **Tasks:**
  - Set up page margins and orientation.
  - Insert a letterhead (or create a simple one).
  - Use appropriate fonts, font sizes, and line spacing.
  - Apply correct letter formatting (indentation, spacing).
  - Insert the date using the date field.
  - Create a professional closing.

Case Study 2: Preparing a Resume

- **Objective:** Design a visually appealing and informative resume.
- **Tasks:**
  - Choose suitable fonts and layout.
  - Use headings, bullets, and tables effectively.
  - Incorporate personal and professional information.
  - Apply consistent formatting throughout the document.
  - Save the document as a PDF for easy sharing.

Case Study 3: Creating a Newsletter

- **Objective:** Design a basic newsletter with multiple columns, images, and text.
- **Tasks:**
  - Create columns and adjust column width.
  - Insert and format images.
  - Use headings, subheadings, and body text effectively.

- Apply consistent formatting and styles.
- Add page numbers and headers/footers.

Case Study 4: Preparing a Report

- **Objective:** Structure a formal report with sections, headings, and references.
- **Tasks:**
  - Create headings and subheadings using styles.
  - Use tables to present data.
  - Insert images or graphs to support the content.
  - Create a bibliography or reference list.
  - Apply appropriate formatting and page layout.

Case Study 5: Mail Merge

- **Objective:** Create personalized letters using a data source.
- **Tasks:**
  - Create a data source with recipient information.
  - Create a main document with merge fields.
  - Perform a mail merge to generate personalized letters.
  - Customize the output format.

Case Study 6: Table Creation and Manipulation

- **Objective:** Create and manipulate tables for data presentation.
- **Tasks:**
  - Insert a table with appropriate rows and columns.
  - Enter data into the table.
  - Apply table styles and formatting.
  - Calculate totals or averages using formulas.
  - Convert the table to a text format.

Case Study 7: Document Formatting and Styles

- **Objective:** Apply different formatting styles to a document.
- **Tasks:**
  - Create custom styles for headings, body text, and other elements.
  - Apply styles consistently throughout the document.
  - Modify existing styles to suit specific requirements.
  - Use styles to create a table of contents.

Case Study 8: Document Protection

- **Objective:** Protect a document from unauthorized access or modification.
- **Tasks:**
  - Set a password to open the document.
  - Restrict editing permissions.
  - Protect the document structure.

Case Study 9: Creating a Brochure

- **Objective:** Design a professional-looking brochure with multiple panels.
- **Tasks:**
  - Create a three-panel layout.
  - Insert images and text in appropriate sections.
  - Use columns to organize content.

Case Study 10: Designing a Flyer

- **Objective:** Create an eye-catching flyer for an event or promotion.
- **Tasks:**
  - Choose a suitable layout and colour scheme.
  - Incorporate images and graphics.
  - Use headings and subheadings effectively.
  - Include contact information and call to action.

Case Study 11: Working with Templates

- **Objective:** Utilize pre-designed templates to create documents efficiently.
- **Tasks:**
  - Choose a suitable template from the available options.
  - Customize the template to fit specific needs.
  - Create custom templates for recurring documents.

Case Study 12: Creating Internal Links within a Document and to website

- **Objective**: Improve document navigation by linking to specific sections.
- **Task**:
  - Select the text to be linked.
  - Insert a bookmark at the target location.
  - Create a hyperlink to the bookmark.
  - Test the internal link to ensure it works as expected.
  - Select the text to be linked.
  - Insert a hyperlink to the desired website.

GENERAL ENGLISH – SOFT SKILLS

Semester I AEC 101	**Paper 4: General English – Soft Skills**	**1L:1T:0P**	**02 Credits 50 Marks (40 UA + 10 CA)**

COURSE OUTCOMES

- C01: To effectively communicate through verbal/oral communication and improve the listening skills. Write precise briefs or reports and technical documents. Soft Skills.
- C02: To actively participate in group discussion / meetings / interviews and prepare & deliver presentations. Become more effective individual through goal/target setting, self-motivation and practicing creative thinking.
- C03: To function effectively in multi-disciplinary and heterogeneous teams through the knowledge of team work, Inter-personal relationships, conflict management and leadership quality.
- C04: To enhance holistic development of students and improve employability skills.

COURSE CONTENTS

UNIT – I: SELF ANALYSIS

SWOC Analysis: Strengths, Weaknesses, Opportunities, Challenges, Master Plans. Enthusiasm: Characteristic & traits of Enthusiastic person, Conducive Condition for Enthusiasm, Ways to be positive. Etiquette: Introduction, Need, Types, Factor Influencing Etiquette, Classification

UNIT – II: ATTITUDE & GROOMING

Attitude: Definition, Factors, Components, Characteristic, Types of Attitudes, TIENS Pak 8 Positive Attitude for Success. Grooming: Need for Personal Grooming, Importance of Proper Dressing, The ways to Groom your Personality, Introduce with Grace, ways to Introduce.

UNIT – III: GOAL SETTING & TIME MANAGEMENT

Goal Setting: Introduction, Importance, ways to set Personal Goals in life, reasons for Goal Setting, failures, SMART Goals, Tips for Setting Goals. Planning: Importance of having a plan, Personal Development Plan, Master Plan, Weekly Planner, Prioritizing Work, To-Do list. Time Management: Essential Elements, Ways to Diagnose Poor Time Management, Tips for Effective Time Management, Techniques.

UNIT – IV: COMMUNICATION AND LEADERSHIP

Communication Skills: Definition, Features, Elements, Types, 9'C of Communication, Barriers to Communication. Public Speaking: Importance, Characteristic of a Good Speaker, ways to overcome the fear of Public Speaking, Listening skills. Team Work: Keys to successful Teamwork, Benefits of Teamwork. Leadership: Qualities of Good Leader, Leadership Styles.

BOOKS:

1. Dr. S. B. Kishor & Swapnil Bhagat, "Soft Skills to Success", Das Ganu Publication, ISBN ISBN: 978-93-84336-60-8
2. R C Sharma and Krishna Mohan, "Business Correspondence and Report writing", Tata McGraw Hill.
3. Pravin Bhatia, S. Chand, "Professional Communication Skills".

REFERENCES:

1. AICTE's Prescribed Textbook: Communication Skills in English (with Lab Manual), Anjana Tiwari, Khanna Book Publishing Co., 2023.
2. Effective Communication Skills. Kul Bhushan Kumar, Khanna Book Publishing, 2022.

INDIAN KNOWLEDGE SYSTEM

Semester I MDE 101	Paper 5: Indian Knowledge System	2L:0T:0P	02 Credits 50 Marks (40 UA + 10 CA)

This course aims to explore the contributions of Indian scholars, institutions, and companies to the field of computing. It will highlight India's role in software development, hardware innovations, and the evolution of computational theories, drawing connections between traditional Indian knowledge systems and modern computing.

Pre-requisites: Basic knowledge of Computer Science and Information Technology

COURSE OUTCOMES

- CO1: To understand India's contributions to the global field of computing.
- CO2: To recognize the influence of traditional Indian knowledge systems in modern-day technology.
- CO3: To familiarize students with key Indian figures and institutions in computer science, software, and hardware development.
- C04: To critically analyze the impact of India's technology sector on the world.

COURSE CONTENTS

UNIT – I: HISTORICAL PERSPECTIVES ON INDIAN KNOWLEDGE AND COMPUTING

- Introduction to Indian Knowledge Systems (IKS): Overview of traditional Indian knowledge in mathematics, astronomy, logic, and philosophy.
- Computational Principles in Ancient India: Concepts of binary logic in Pingala's Chandas Shastra, contributions to algorithmic thinking through the works of Aryabhata, Brahmagupta, and Bhaskaracharya.
- Mathematics and Algorithms: Vedic mathematics and its influence on algorithm development; ancient Indian contributions to the concept of zero and positional notation.

UNIT - II: INDIA'S CONTRIBUTION TO GLOBAL COMPUTING

- Pioneering Indian Computer Scientists:
  - Dr. Homi J. Bhabha: Contributions to computing in India and the foundation of the Tata Institute of Fundamental Research (TIFR).
  - Prof. Narasimhan and Dr. R. Narasimhan's contributions to theoretical computer science and early developments in Indian computing.
  - Dr. Raj Reddy: Innovations in artificial intelligence and human-computer interaction.
- Development of PARAM Supercomputer, Significance in global computing.

UNIT - III: INDIAN SOFTWARE INDUSTRY AND GLOBAL IMPACT

- The Rise of Indian Software Firms:
  - TCS (Tata Consultancy Services): Role in shaping global outsourcing and IT services.
  - Infosys: Innovations in global delivery models, role in corporate governance
  - Wipro: Contributions to software engineering and corporate sustainability
  - HCL Technologies: Innovations in both hardware and software development.
- Contributions to Open Source and Global Software Projects:
  - Indian developers' involvement in global open-source projects (Linux, Python, etc.).
  - NASSCOM's role in promoting India's global IT capabilities.
  - India's Software Talent and Brainpower: India's prominence in global software development, particularly in Silicon Valley

UNIT - IV: **INDIAN ACADEMIA AND RESEARCH CONTRIBUTIONS**

- Role of Indian Institutes in Computer Science:
  - IITs (Indian Institutes of Technology): Contributions to computer science education and research.
  - Indian Institute of Science (IISc) and its role in computing research.
  - NITs, NIC and IIITs as hubs for research in emerging technologies like AI, data science, and blockchain.
- Important Indian Research Labs and Collaborations:
  - TCS Research, Infosys Labs, and Wipro Labs: Contributions to software engineering, cybersecurity, AI, and more.
  - DRDO's (Defense Research and Development Organization) role in high-performance computing and simulation technologies.

BOOKS:

1. "Computers and Thought: A Practical Introduction to Artificial Intelligence" by Dr. Raj Reddy
2. "Supercomputing in India: A Strategic Initiative"* by Dr. Vijay Bhatkar
3. "From Zero to Infinity: India's Contribution to Mathematics and Computing" by George Gheverghese Joseph

ENVIRONMENTAL SCIENCE AND SUSTAINABILITY

Semester I **VAC 101**	**Paper 6: Environmental Science and Sustainability**	**2L:0T:0P**	**02 Credits** **50 Marks** **(0 UA + 50 CA)**

COURSE DESCRIPTION

This course aims to integrate environmental science and sustainability principles within computer disciplines. It will focus on the ecological impact of computing technologies, the growing issue of e-waste, and strategies for sustainable IT practices, including recycling and responsible e-waste management.

COURSE OUTCOMES

- CO1: To understand the environmental impact of the computer and IT industry.
- CO2: To study the principles of sustainability and their application in computing.
- CO3: To explore the lifecycle of electronic devices and the issue of e-waste.
- CO4: To learn about effective e-waste management strategies, recycling technologies, and policies for minimizing ecological footprints.
- CO5: To promote awareness of green computing and sustainable development in IT practices.

COURSE CONTENTS

UNIT - I: **INTRODUCTION TO ENVIRONMENTAL SCIENCE AND SUSTAINABILITY**

- Introduction to Environmental Science: Key environmental challenges and their connection to technology.
- Sustainability Concepts: Definition and principles of sustainability; sustainable development goals (SDGs). The role of sustainability in the context of computer science and IT.
- Environmental Impact of the IT Industry: Carbon footprint of data centers, energy consumption of computing devices, and the lifecycle of electronic products.

UNIT - II: **E-WASTE: CHALLENGES AND IMPACT**

- E-Waste: Definition and classification of e-waste. Common sources of e-waste (computers, smartphones, peripherals, etc.).
- Global and Local Impact of E-Waste: The growing volume of e-waste worldwide and in India.
- Environmental and human health impact of improper e-waste disposal (toxic chemicals, pollution, health hazards).

UNIT - III: **E-WASTE IN THE IT SECTOR & RECYCLE**

- E-Waste in the IT Sector: Rapid innovation cycle in IT and its electronics contributes to e-waste generation.
- E-Waste Recycling Technologies: Processes for recycling metals, plastics, and other components from electronic devices. Emerging technologies in e-waste recycling: chemical recycling, pyrometallurgy, and hydrometallurgy.

UNIT - IV: GREEN COMPUTING AND SUSTAINABLE IT PRACTICES

- Green Computing Principles: Definition of green computing. Practices for reducing energy consumption in data centers, servers, and personal computing devices.
- Corporate Social Responsibility (CSR) and E-Waste Management: Mechanism IT and tech companies are incorporating e-waste management into their CSR initiatives.

BOOKS:

1. "E-Waste: Impacts, Challenges, and the Role of Recycling" by Rakesh Johri.
2. "Green Computing: Tools and Techniques for Saving Energy, Money, and Resources" by Bud E. Smith.
3. "E-Waste Management: From Waste to Resource" by Majeti Narasimha Vara Prasad.
4. Government of India's E-Waste (Management) Rules, 2016.

REFERENCES Web links:

1. https://www.ourplanet.com
2. https://www.undp.org/content/undp/en/home/sustainable-development-goals.html
3. www.myfootprint.org
4. https://www.globalchange.umich.edu/globalchange1/current/lectures/kling/ecosystem/ecosystem.html
5. United Nations Environment Programme (UNEP): www.unep.org
6. Sustainable Development Solutions Network (SDSN): www.unsdsn.org
7. World Resources Institute (WRI): www.wri.org
8. Global E-Waste Monitor: globalewastemonitor.org
9. The Green Electronics Council: globalelectronicscouncil.org
10. The International Journal of Green Computing: www.ijgc.org
11. International Telecommunication Union (ITU) - Green ICT: http://www.itu.int

ADDITIONAL COURSE – HINDI (उद्यमिता का परिचय - I)

Semester I **AEC 102**	**Paper 7: Hindi** (उद्यमिता का परिचय-I)	**1L:1T:0P**	**02 Credits** **50 Marks** **(00 UA + 50 CA)**

COURSE OBJECTIVE: To know about Entrepreneurship, Business planning, Startups and Innovation. यह पाठ्यक्रम आपको कंप्यूटर विज्ञान के क्षेत्र में उद्यमिता के साथ-साथ हिंदी भाषा में तकनीकी समझ और व्यावसायिक क्षमताओं का विकास करने में सहायता करेगा। हिंदी एक महत्वपूर्ण भारतीय भाषा है और इसके माध्यम से कंप्यूटर और उद्यमिता को समझने से आप व्यापक भारतीय परिप्रेक्ष्य में अपनी दक्षता बढ़ा सकेंगे। इस तरह का परिचयात्मक वाक्यांश छात्रों को यह समझाने में मदद करेगा कि हिंदी में इस विषय को सीखने का महत्व क्या है और यह किस प्रकार उनकी व्यावसायिक और तकनीकी दक्षताओं को समृद्ध कर सकता है।

COURSE CONTENTS

UNIT - I: उद्यमिता का परिचय (Introduction to Entrepreneurship)

उद्यमिता की परिभाषा और महत्व, उद्यमिता के सिद्धांत और विशेषताएँ, कंप्यूटर और तकनीकी उद्योग में उद्यमिता का विकास, तकनीकी और गैर-तकनीकी उद्यमिता का अंतर, सफल उद्यमियों के उदाहरण और प्रेरणा

UNIT - II: व्यवसाय योजना और रणनीति (Business Planning and Strategy)

व्यवसाय योजना का महत्व और संरचना, व्यवसाय मॉडल निर्माण की तकनीकें, कंप्यूटर आधारित स्टार्टअप्स के लिए रणनीतिक योजना, मार्केट रिसर्च और प्रतिस्पर्धा विश्लेषण, वित्तीय योजना और पूंजी प्रबंधन

UNIT - III: उत्पाद विकास और नवाचार (Product Development and Innovation)

उत्पाद और सेवा की योजना, सॉफ्टवेयर और हार्डवेयर उद्योग में नवाचार की भूमिका, नवाचार प्रक्रिया और उसकी चुनौतियाँ, तकनीकी उत्पादों का परीक्षण और विकास, उद्यमियों के लिए डिज़ाइन थिंकिंग और प्रोटोटाइप

UNIT - IV: स्टार्टअप्स और वित्तीय संसाधन (Startups and Financial Resources)

स्टार्टअप्स की स्थापना और विकास के चरण, निवेश के स्रोत: एंजल इन्वेस्टर्स, वेंचर कैपिटल, बैंक लोन, सरकारी योजनाएँ और अनुदान (Startup India, MSME), वित्तीय प्रबंधन और बजटिंग, स्टार्टअप्स के लिए जोखिम प्रबंधन

BOOKS:

1. स्टार्टअप इंडिया - उद्यमिता का नया दौर", अशोक कुमारी, प्रभात प्रकाशन
2. उद्यमिता विकास और प्रबंधन, बी.एल. गुप्ता, वर्धमान प्रकाशन

Alternative NPTEL/SWAYAM Course: Students may take courses on Indian or foreign subjects through platforms like NPTEL or SWAYAM and must submit the result before the start of University examination.

SEMINAR

Semester I SEC 102	**Paper 8: Seminar**	**1L:0T:0P**	**01 Credits 25 Marks (00 UA + 25 CA)**

COURSE OUTCOMES

- CO1: To analyze a current topic of professional interest and present it before the audience.
- CO2: To familiar with basic technical writing concepts and terms, such as audience analysis, jargon, format, visuals, and presentation and acquired the basic skills to for performing literature survey and paper presentation.
- CO3: To improve skills to read, understand, and interpret material on technology.
- CO4: To improve communication and writing skills and prepare the report

The seminar must focus on current trends in IT, Computer Science, or Computer Applications. Each student is required to deliver a PowerPoint presentation accompanied by a written Seminar Report. Students are advised to adhere to the following guidelines when selecting and preparing their seminar topics.

Semester I: Introductory Topics:

A student needs to select a topic from the list below or one that is somewhat related to this topic,

1. Evolution of Technology in Everyday Life
2. Basics of Internet and Web Browsing
3. Introduction to Social Media and Digital Communication
4. The Functionality of Computers: Key Characteristics, Advantages, and Limitations
5. Exploring Storage Devices and its features and application
6. Exploring Types of Primary Memory
7. Number System Techniques and Applications
8. Communication and the Need for Networking
9. E-mail Functionality and Best Practices
10. Using Search Engines Effectively: Techniques and Tips
11. Understanding Network Topology
12. PC Maintenance Essentials
13. Data Privacy and Protection
14. Basic Concepts of Virtualization and Its Benefits
15. Ethics in Computing

Guidelines to Seminar

1. Selection of Seminar Topic: The topic chosen must be based on the latest trends. Ensure that it is relevant and up-to-date.
2. Topic Approval: The seminar topic must be approved by the department-assigned guide before the deadline as per the university timetable.
3. Group Presentations: Students are allowed to present the seminar in groups of up to 3 members.
4. Presentation Aids: Students are encouraged to use graphical, animated, audio, and video aids to enhance their seminar presentations.
5. Evaluation: The seminar will be evaluated by an internal examiner appointed by the department.
6. Seminar Report Submission: Students must submit their seminar reports before the prescribed deadline with the approval of their respective guides. Failure to meet the deadline may result in appropriate action being taken against the student.
7. Report Format:
    a) The report should be printed on A4-size bond paper with 1.5 line spacing.
    b) Left margin: 1.5 inches, Right margin: 1.0 inch.
    c) The report must be properly spiral bound.
    d) Only one copy of the report needs to be submitted.
8. Certificates and Declarations: Students are required to include the necessary certificates and declarations, duly signed, and enclosed in their reports.

Bachelor in Computer Application (BCA)

SEMESTER – II

Bachelor in Computer Application (BCA)

SEMESTER II

Sr. No.	Course Code	Course Title	L	T	P	Credit	% of Assessment				
							UA	CA	Total (UA+CA)	Min. Passing (UA+CA)	
										(%)	Marks
1	CC103	Operating System & Linux	3	0	0	3	60	15	75	40%	30
2	CC104	Programming in 'C'	3	0		3	60	15	75	40%	30
		Lab	0	0	4	2	30	20	50	50%	25
3	CC105	Database Management System	3	0	0	3	60	15	75	40%	30
		Lab	0	0	2	1	15	10	25	50%	13
4	SEC103	E-Commerce and Web Design	3	0	0	3	60	15	75	40%	30
		Lab	0	0	4	2	30	20	50	50%	25
5	VAC102	Indian Constitution	2	0	0	2	-	50	50	50%	25
6	AEC103	Additional Course[1] - Indian or Foreign Language	1	1	0	2	40	10	50	50%	25
7	SEC104	Seminar	1	-	0	1	-	25	25	50%	13
Total			**16**	**1**	**10**	**22**	**355**	**195**	**550**		

Note 1: Indian Languages: Hindi

If a student selects another reginal Indian or foreign language: Student must complete this language course on Swayam or NPTEL and submit the necessary documentation/result before the start of university exam.

OPERATING SYSTEM & LINUX

Semester II CC103	Paper 1: Operating System & Linux	3L:0T:0P	03 Credits 75 Marks (60 UA + 15 CA)

COURSE OUTCOMES

- CO1: Understand the roles and functions of operating systems, including various OS types.
- CO2: Analyse system components like processes, memory, and file systems, and manage processes effectively.
- CO3: Gain proficiency in Linux commands for file management and system navigation.
- CO4: Develop basic shell scripts, manage permissions, and utilize pipes, filters, and control structures.

COURSE CONTENTS

UNIT – I: INTRODUCTION TO OPERATING SYSTEM

Operating System: Introduction, Purpose, Function, and Role of operating System.
Types of OS: Concepts of Batch, Multi Programmed, Time-Sharing, Parallel, Real-Time Computer System Structure: Computer, System Operation, I/O interrupt, Storage Structure and Storage Hierarchy, Hardware Protection: Dual Mode Operation, I/O Memory and CPU Protection

UNIT – II: OPERATING SYSTEM STRUCTURE

System Components: Process, Main Memory, File I/O System, Secondary Storage Management, Networking, Protection System, Command Interpreter System, System Call.
Process and Job Control: Process and Types of Process, Process State, Operation on Process, File Manipulation Device Management, Information Maintenance and Communication.

UNIT – III: LINUX

Structure of Linux Operating System, Exploring the directory structure, Naming Files and Directories Shell: Bourne, Korn and 'C' Shells. Directory Commands, File Management Commands, General Commands Standard input-output and error file, Filter, Pipe Line, Text editing with vi editor

UNIT – IV: SHELL SCRIPTS

Unix Communication, Permission Modes: chmod, chown, chgrp. Process: ps, kill
Shell Scripts: Variables, Input and Output Statements, Arithmetic in Shell Script, Conditional and Control flow statements, Shell Parameters

BOOKS:

1. Andrew S. Tanenbaum, "Modern Operating Systems", PHI.
2. Abraham Silberschatz, Peter Baer Galvin, Greg Gagne (2006), Operating System Principles, 7th edition OR Later edition, Wiley India Private Limited, New Delhi.
3. Ekta Walia, Operating Systems Concepts, Khanna Publishing House, 2022

REFERENCES:

1. Brain Proffitt, "RedHat Linux 7", PHI.
2. "Teach Linux in 24hours", SAMS Techmedia, ISBN:81-7635-499-6
3. Grant Taylor, "Linux Complete", BPB pub., ISBN:81-7656-170-3

PROGRAMMING IN 'C'

Semester II CC104	Paper 2: Programming in 'C'	3L:0T:0P	03 Credits 75 Marks (60 UA + 15 CA)

COURSE OUTCOMES

- CO1: Understand C programming basics, including data types, variables, and operators.
- C02: Apply loops and arrays for solving computational problems.
- C03: Implement functions, structures, and unions for efficient data management.
- CO4: Use pointers and file handling for memory and file operations.

COURSE CONTENTS

UNIT – I: BASIC PROGRAMMING ELEMENTS

'C' Character Set, Tokens, Keywords, Basic Structure of 'C' Program, Data Types, Identifiers, Types of Constants, Variables, Type Casting.

Operators and Expressions – Arithmetic, Relational, Logical, Assignment, Increment and Decrement Operator, Updating Assignment, Hierarchy of Operators, Mathematical Functions in 'C'. Formatted Function: scanf( ), printf( ), Backslash Character.

Conditional Statement: if statement, if-else statement, Nested if statement, else-if ladder, switch statement, Ternary Operator

UNIT – II: LOOPING STATEMENTS AND ARRAYS

Looping Statement: Need of Looping Statement, for Loop, Comma operator, while statement, do-while statement, Infinite loop, Nested Loop. Jumping Constructs: break statement, use of break, continue, goto statements and exit().

Arrays: Need of Array, Array Definition, One Dimensional Array, Declaration and Initiation of one-dimension array, Bound Checking, Problem on Arrays, Handling Matrix.

UNIT - III: FUNCTIONS & STRUCTURE

Function Definition, Library Functions, Need for user defined Function, User Defined Functions, Advantages of functions, Function Prototype, Function Call, Types of User-Defined Functions, String Library Functions, Arrays & Functions, and Storage Classes.

Structure & Union: Need of Structure, Definition of Structure, Declaring Structure, Period operator, Initialization of structure, Accessing Structure Elements, Array of Structure, Nesting of Structure. Introduction to Union, Characteristics of Union, Enumeration.

UNIT - IV: POINTER & FILE HANDLING

Pointer: Introduction to Pointer, Declaring Pointer Variables, Initialization of Pointer variable, Pointer operator, Pointer & Function (Call by Value & Call by Reference), Pointer & Arrays, Pointer & Strings, Pointer & Structure, Pointer to Pointer.

File Handling: Introduction, Opening & Closing File, Input & Output File handling functions, Error Handling During I/O Operations, Random Access to Files, Difference between Binary Mode & Text Mode, Command Line Arguments.

BOOKS:

1. E. Balagurusamy, "Programming in ANSI C", TMH, ISBN- 0-07-068182-1
2. Dr. S. B. Kishor, "Programming in C", Das Ganu Prakashan, ISBN: 978-93-84336-21-9
3. L. Juneja, "Programming in C", Cengage Learning, ISBN 81-315-1429-3

REFERENCES:

1. K. R. Venugopal & S. R. Prasad, "Mastering C", ISBN- 0-07-061667-1
2. S. Shrivastav, "C in Depth", ISBN 81-7656-107-X

LAB

Semester II CC104	LAB (Programming in 'C')	0L:0T:4P	02 Credits 50 Marks (30 UA+ 20 CA)

UNIT - I: BASIC PROGRAMMING ELEMENTS

1. Electricity Bill Calculator: Design a program to calculate the electricity bill for customers based on units consumed. Use conditional statements to apply different rates for various consumption slabs (e.g., 0-100 units, 101-200 units).
2. ATM Transaction System: Create a program that mimics ATM transactions like cash withdrawal, deposit, and balance inquiry. Use various C operators and data types for managing the user's account balance.
3. Simple Calculator: Develop a calculator using arithmetic, relational, and logical operators that performs operations like addition, subtraction, multiplication, and division based on user input.
4. Body Mass Index (BMI) Calculator: Write a program that calculates and categorizes the user's BMI (underweight, normal weight, overweight, obese) based on height and weight input.
5. Currency Converter: Create a currency converter that takes an amount in one currency and converts it to others (e.g., DUSD to INR, EUR to GBP). Use the conditional operator and format the output with `printf()`.
6. Voting Eligibility Checker: Write a program that checks if a user is eligible to vote based on age input and nationality. Use conditional statements like `if-else` to determine eligibility.
7. Tax Calculator: Implement a tax calculator that takes the user's annual income and calculates tax based on predefined income slabs using conditional and logical operators.

UNIT - II: LOOPING STATEMENTS AND ARRAYS

1. Student Marks Analyzer: Create a program that inputs the marks of multiple students and calculates the class average, highest, and lowest scores using arrays and loops.
2. Simple Banking System: Write a program that simulates a banking system, allowing users to deposit and withdraw money using looping constructs. Use arrays to manage multiple customer accounts.
3. Prime Number Finder: Develop a program that finds all prime numbers up to a user-specified number using loops and array storage.
4. Matrix Operations: Write a program to perform matrix operations (addition, subtraction, and multiplication) using nested loops and arrays.
5. Sorting Algorithm Implementation: Implement bubble sort or selection sort on an array of integers and display the sorted array using loops and array manipulation.
6. Daily Temperature Tracker: Record daily temperatures over a month and calculate the monthly average, highest, and lowest temperatures. Use loops and arrays to process the data.
7. Fibonacci Series Generator: Create a program that generates and prints the Fibonacci sequence up to a given number using loops and arrays for storage.

UNIT - III: FUNCTIONS & STRUCTURES

1. Bank Account Management: Implement a banking system using structures to store customer details (name, account number, balance). Use functions to perform operations like deposit, withdrawal, and balance check.
2. Hospital Patient Management: Design a program where each patient has details like name, age, disease, and doctor assigned using structures. Use functions to add, update, and display patient records.
3. Sales Management System: Create a program that tracks product sales using structures to store product details (ID, name, price, quantity). Functions should be used to calculate total sales, update inventory, and display details.
4. Employee Attendance Tracker: Develop an employee attendance system using structures to store employee data (ID, name, attendance) and functions to mark attendance and calculate total working days.
5. College Student Record System: Build a system to store student records (name, roll number, grades) using structures. Use functions to calculate total marks, percentage, and grades based on student performance.
6. Function-Based Calculator: Implement a basic calculator that performs arithmetic operations using separate functions for addition, subtraction, multiplication, and division.
7. Hotel Reservation System: Design a hotel booking system using structures to manage room details (room number, type, availability) and functions to check availability, book, and cancel reservations.

UNIT - IV: POINTERS & FILE HANDLING

1. File-Based Student Database: Create a student database where student information is stored and retrieved from a file. Use pointers to navigate records and handle file I/O for reading and writing data.
2. Employee Salary Slip Generator: Develop a program that calculates and prints employee salary slips. Use pointers for memory management and file handling to store salary details.
3. Hospital Patient Record System: Implement a system that stores patient records in a file. Use pointers to access and update records, and handle file operations for reading and writing patient data.
4. Library Book Management: Create a library management system where book details are stored in a file. Use pointers to manage memory and file handling to add, search, and delete books.
5. Command-Line Argument Processor: Write a program that takes file names as command-line arguments, opens them, and displays their contents using file handling functions and pointers.
6. File-Based Attendance Tracker: Design an attendance tracking system where attendance data is stored in files. Use pointers to update attendance records and retrieve them based on user input.
7. Pointer-Based Memory Manager: Create a program that dynamically allocates and deallocates memory for storing student information using pointers. Implement file handling to store and retrieve this information persistently.

DATABASE MANAGEMENT SYSTEM

Semester II CC105	Paper 3: Database Management System	3L:0T:0P	03 Credits 75 Marks (60 UA + 15 CA)

COURSE OUTCOMES

- CO1: Grasp fundamental DBMS concepts, components, and the role of the Database Administrator (DBA).
- CO2: Learn and implement data models and normalization techniques for efficient database design.
- CO3: Gain hands-on experience in creating and managing databases using MS-Access.
- CO4: Develop skills in designing advanced queries, forms, and reports for database management.

COURSE CONTENTS

UNIT - I: - INTRODUCTION TO DBMS

Basic Terminology, Data Processing, Traditional Environment, Advantage and Disadvantage of Traditional File Processing System, DBMS Environment/Facilities, Elements of DBMS, Component Of DBMS, Database User, Function, Objective and Benefits of the Database Approach, Characteristic of DBMS, Advantages and Disadvantages of DBMS, The Three-Level Architecture, Three-Tier Architecture, Data Abstraction, DBA Role, Function and Responsibility

UNIT - II: ARCHITECTURE AND DATA MODEL & NORMALIZATION

Data Model: Classification, Approaches to the Relational Model, Hierarchical Model and Network Model with an Example, Entity-Relationship Model. Entity, Entity set, Attributes, Type of Attribute's.

Normalization: Functional Dependency, Normalization, Normal Forms (1NF, 2NF, 3NF, BCNF, 4NF, 5NF), Relational Database Structure, Relational Algebra, Codd's Rules.

UNIT – III: - WORKING WITH MS-ACCESS

Elements of an Access database - Tables, Queries,Forms, Reports and Macros.

Introduction to MS-Access, Designing Database, Crating Database using Wizard, Working with Table. **Field Types and their properties** - Auto number, Date/Time, Number, Text, Yes/No, Hyperlink. Creating Tables using Design View and using wizard, Editing Table, Managing data of table.

UNIT – IV: - QUERY AND FORM DESIGNING QUERY

Filtering Data, Query, Types of Queries, Specifying Criteria in Queries, Query based on multiple table, Parameter query, cross tab query, Action Queries, Filter using multiple criteria. **Forms, Report and Macro:** Procedure to create a Form, Reports and Macros.

Import and export database. Backup procedure in Ms-Access.

BOOKS:

1. Dr. S. B. Kishor, "Database Management System & MS-Access", Das Ganu, ISBN: 978-93-81660-92-8
2. Philip J. Pratt, "Database Management System", Cengage Learning, ISBN- 81-315-0969-9
3. Caleste Robinson, "Access 97", BPP, 1998, ISBN: 81-7029-928-4

REFERENCES:

1. Silberschatz, Korth, Sudarshan "Database System Concepts ", BPB, ISBN- 0-07-120413-X.
2. Panneer Selvem, "Database Management Systems", PHI, ISBN- 81-203-2028X.

LAB

Semester II CCC105	LAB (Database Management System)	0L:0T:2P	01 Credits 23 Marks (15 UA+ 10 CA)

Case Study on Database: Student Admission and Unit Test System

Objective: Develop a simple Student Admission and Unit Test System in MS-Access. The system will manage student admissions, courses, unit test scores, and reports. It will include data entry, manipulation, various types of queries (simple, advanced, and action queries), generating forms and reports, and exporting/importing data to/from Excel.

Stage 1: Database Design and Table Creation

1. Student Table: Fields: StudentID (AutoNumber, Primary Key), FirstName (Text), LastName (Text), DOB (Date/Time), Gender (Ye/No), PhoneNumber (Text), Address (Text), AdmissionDate (Date/Time)
2. Course Table: Fields: CourseID (AutoNumber, Primary Key), CourseName (Text), Credits (Number), InstructorName (Text)
3. Enrollment Table: Fields: EnrollmentID (AutoNumber, Primary Key), StudentID (Number, Foreign Key), CourseID (Number, Foreign Key), UnitTest1Score (Number), UnitTest2Score (Number), FinalTestScore (Number)

Relationship:

- Establish a relationship between the Student Table and the Enrollment Table using the StudentID.
- Establish a relationship between the Course Table and the Enrollment Table using the CourseID.

Stage 2: Entering and Manipulating Data

Entering Data:

- Student Data: Enter details of students.
- Course Data: Enter details of available courses and assign instructors.
- Enrollment Data: Enroll students in various courses and enter their Unit Test and Final Test scores.

Updating Data:

- Change the phone number of a student directly in the Student Table.
- Edit course details, such as updating the instructor's name.

Deleting Data:

- Remove a student who has withdrawn from the course using a delete query or by manually deleting the record.

Stage 3: Performing Simple Queries

- Select Query**:** Retrieve all students who scored above 70 in Unit Test 1 across all courses.
- Parameterized Query: Create a parameterized query that asks for the course name and retrieves the students enrolled in that course.

Sorting and Filtering:

- Sort the list of students by their last name.
- Filter out students who have not passed Unit Test 2 (e.g., scoring below 40).

Stage 4: Advanced Queries

Action Queries:

- Update Query: Increase the Final Test Score of all students in a specific course by 5 points if their score is below 60.
- Append Query: Add a new batch of students into the Student Table.
- Delete Query: Remove students who scored below 30 in both unit tests.

Join Queries:

- Create an Inner Join Query between the Student Table and the Enrollment Table to display student names along with their scores in Unit Test 1 and Unit Test 2 for a specific course.

Aggregate Queries:

- Calculate the average score of all students in a specific course for Unit Test 1 and Unit Test 2.
- Count the number of students enrolled in each course using a Group By query.

Stage 5: Generating Forms

- Student Admission Form**: C**reate a form to simplify the entry of new student information into the Student Table. The StudentID should auto-generate, and other fields should allow easy data entry.
- Course Enrollment Form: Design a form for enrolling students in courses. This form will link the student to a course and allow input of their unit test and final test scores.
- Navigation Form: Develop a navigation form that allows users to easily switch between the Student Admission Form, Course Enrollment Form, and Reports.

Stage 6: Creating Reports

- Student Performance Report: Generate a report showing the performance of each student across all unit tests and the final test. The report should group students by course and show their total and average scores.
- Course Summary Report: Create a report listing all courses with the number of students enrolled in each course and the average score in each unit test.
- Custom Report: Design a report to display students who have scored above 85 in Unit Test 2 and format it for easy review by the faculty.

Stage 7: Importing and Exporting Data

- Import Data: Import student data from an Excel sheet into the Student Table. Ensure that the field mappings match and that new records are correctly added.
- Export Data: Export the Student Performance Report to an Excel file to share with other departments or external reviewers.
- Export the Course Summary Report to a PDF format for administrative review.

Stage 8: Backup and Maintenance

- Database Backup: Create a backup copy of the database before making significant changes or updates. Save the backup in a secure location.
- Compact and Repair: Perform a Compact and Repair operation to optimize the database, reduce file size, and ensure smooth performance.

E-Commerce and Web Design

Semester II SEC103	Paper 4: E-Commerce and Web Design	**3L:0T:0P**	**03 Credits 75 Marks (60 UA + 15 CA**

COURSE OUTCOMES

- CO1: To Gain a comprehensive understanding of the E-Commerce landscape, current and emerging business models.
- CO2: To learn the technology and infrastructure under pinning's of the business.
- CO3: To Leverage the E-Commerce platforms to enhance current business or in curate new businesses.
- CO4: To Gain an understanding on how innovative use of the E-Commerce can help developing competitive advantage.

COURSE CONTENTS

UNIT - I: E-COMMERCE AND INTRODUCTION TO THE INTERNET

E-Commerce- Introduction, Application, Definition, Benefits of E-Commerce, Impediments of E-Commerce, Difference between Traditional and Electronic Commerce. Electronic Data Interchange (EDI): Introduction, Features of EDI, Benefits, Value Added Services (VAS), Three Pillars of Ecommerce, Trade Cycle. Introduction to Web Designing- Internet, Basic Internet Terms, Internet Addressing, Protocols, Internet Protocols, Services of the Internet, Search Engine.

UNIT - II: BASIC OF HTML AND TAG

Introduction to HTML - Introduction, Features of HTML, Advantages & Disadvantages of HTML, HTML Editors, Step to Create and View HTML Document, Basic Structure of HTML Program
Tags & Attributes- Classification of HTML Tags- Logical Tags, Layout Tags, Text and character Formatting Element. Block Formatting Tags-Headings, Block Alignment, pre-format Text, Address, Font Tags, Alignment Attributes, Marquee tag.

UNIT - III: WORKING WITH HTML

List - Introduction to Lists, Unordered List, Ordered List, Definition List, Nested List, Difference Between Ordered and Unordered List. Linking - Introduction, Type of Hyperlink Creation, Working with Links, Pathname, Types of Linking or Anchors. Embedding Multimedia in Web Page - Image Tag, Align Images, Embedding Inline Images and External Images,

UNIT - IV: ADVANCED HTML

Tables - Basic table tags and their related attributes Frames- Frames, <Frame> and <Frameset> tags and related attributes Form designs, Form tag, Text Fields, password fields, radio buttons, and checkboxes. Reset and submit buttons, Select tag, option tag, and text area tag.
Introduction to CSS: Concept of CSS, Creating of Style sheet, CSS Properties, CSS Styling (Background, Text Format, Controlling Fonts), Working with block elements and objects, Working with Lists and Tables, CSS Id and Class, Box Model (Introduction, Border properties, Padding Properties, Margin properties)

BOOKS:

1. Complete HTML, BPB, 2010, ISBN-13:978-0-07-070194-6.
2. Greenstein and Feinman, "Electronic Commerce", TMH, 2000, TMH, ISBN-0-07-042141-2
3. Dr. S. B. Kishor, Rajani Singh, "E-Commerce and Web Design", ISBN: 978-93-81660-52-2

REFERENCES:

1. Xavier, "Web Technology and Design", TMH,2010, ISBN-13:978-81-224-1450-9
2. Bhushan Dewan, "E-Commerce", S. Chand,2001, First Edition, ISBN - 81-219-2083-3

LAB

Semester II **SEC103**	**LAB** **(**E-Commerce and Web Design**)**	**0L:0T:4P**	**02 Credits** **50 Marks** **(30 UA+ 20 CA)**

UNIT - II: BASICS OF HTML AND TAGS

1. Case Study: Welcome Page for a College Website

- Scenario: You are tasked with creating a simple welcome page for a college website. The page should include the College's name, a welcoming message, and a list of facilities provided by the College.
- Answer this Question in Assignment Book: What HTML tags will you use to structure the content? How will you format the heading, paragraph, and the list of facilities?

2. Case Study: Personal Blog Introduction

- Scenario: Create the introductory page of a personal blog. The page should include the blog's title, a brief introduction about the author, and a list of topics covered in the blog (ordered by priority).
- Answer this Question in Assignment Book: Which HTML tags would be appropriate to create a title, introduction, and an ordered list of topics?

3. Case Study: Product Feature List

- Scenario: Design a webpage that lists the features of a new product. Include the product name, a description, and a bullet-point list of features.
- Answer this Question in Assignment Book: How will you structure this information? Which tags will you use to create the list, and how will you nest any necessary tags?

4. Case Study: About Us Page

- Scenario: You are asked to create an "About Us" page for a small business. The page should have sections for the company's mission, values, and a team list.
- Answer this Question in Assignment Book: How would you organize the content using block formatting tags? Which tags will you nest within each section?

5. Case Study: Menu for a Restaurant Website

- Scenario: Design a menu page for a restaurant. The page should list different types of meals (e.g., appetizers, main courses, desserts) and their prices.
- Answer this Question in Assignment Book: How would you represent the menu items? Would you use ordered or unordered lists, and how would you differentiate between meal categories?

UNIT - III: WORKING WITH HTML

6. Case Study: Linking Pages on a Portfolio Website

- Scenario: You need to create a portfolio website with separate pages for projects, contact information, and a resume. There should be links on each page to navigate between them.
- Answer this Question in Assignment Book: What types of hyperlinks will you use? How will you structure the links to ensure easy navigation?

7. Case Study: Photo Gallery for a Travel Blog

- Scenario: Create a photo gallery page for a travel blog. Include captions for each image and ensure that all images align properly.
- Answer this Question in Assignment Book: Which HTML tags and attributes will you use to embed and align the images? How will you ensure that the images display correctly on the page?

8. Case Study: Embedding External Content

- Scenario: You want to embed a video from an external website and display it on your page. The page should also include some explanatory text below the video.
- Answer this Question in Assignment Book: How will you embed the video using HTML? Which tags and attributes will you use to ensure the content is embedded correctly?

9. Case Study: Company's Product Table

- Scenario: Create a webpage that displays a table of the company's products, including columns for product name, description, and price.
- Answer this Question in Assignment Book: How will you structure the table using HTML? What attributes will you apply to ensure the table is easy to read and well-organized?

10. Case Study: Website Layout Using Frames

- Scenario: Design a webpage layout using frames. The page should have a navigation menu on the left and content displayed on the right.
- Answer this Question in Assignment Book: How will you use the `<frame>` and `<frameset>` tags to achieve this layout? What considerations need to be taken into account regarding usability?

UNIT - IV: ADVANCED HTML

11. Case Study: Customer Feedback Form

- Scenario: Develop a customer feedback form for a website. The form should include fields for the customer's name, email, rating (out of 5), and a comments section.
- Answer this Question in Assignment Book: Which form controls will you use to collect this information? How will you ensure that the form is user-friendly and accessible?

12. Case Study: Survey Form for Market Research

- Scenario: Create a survey form for market research. Include multiple-choice, checkboxes for multiple selections, and a text area for additional comments.
- Answer this Question in Assignment Book: How will you organize the form fields? What type of form controls will you choose to collect different types of data?

13. Case Study: Login Page for a Website

- Scenario: Design a login page for a website that requires users to enter a username and password. Include a "Forgot Password?" link and a submit button.
- Answer this Question in Assignment Book: What form controls will you use? How will you ensure the security and privacy of the user input?

14. Case Study: Online Portfolio Website Styling

- Scenario**:** Create a stylish and responsive online portfolio for a web developer. The website should showcase different projects, include a professional bio, and offer an easy way for potential clients to contact the developer. CSS should be used to handle all visual elements, such as layout, fonts, colors, and responsiveness.
- Answer this Question in Assignment Book: How will you organize the stylesheets and control the layout and visual design using CSS?

15. Case Study: Corporate Dashboard Design

- Scenario**:** Design a user interface for a corporate dashboard that shows key performance indicators (KPIs) and other vital information. CSS should be used to style charts, tables, navigation menus, and widgets, and to ensure a clean, professional look that is responsive on all screen sizes.
- Answer this Question in Assignment Book: How will you ensure the layout is user-friendly and adjusts across devices using CSS?

Indian Constitution

Semester II VAC 102	**Paper 5: Indian Constitution**	**2L:0T:0P**	**02 Credits 50 Marks (00 UA+ 50 CA)**

COURSE OUTCOMES

- CO1: **Understand the Constitution**: Grasp the historical context, principles, and interpretations of the Indian Constitution, including Fundamental Rights and State Policy Principles.
- CO2: **Analyse Union Government Structure**: Explain the roles and powers of the President, Prime Minister, and the two Houses of Parliament.
- CO3: **Examine State Government and Local Administration**: Understand the functions of the Governor, Chief Minister, State Secretariat, and district and municipal governance.
- CO4: **Evaluate the Election Commission**: Comprehend the role and responsibilities of the Election Commission and its officials in ensuring electoral integrity.

COURSE CONTENTS

UNIT - I: THE CONSTITUTION - INTRODUCTION

- The History of the Making of the Indian Constitution, Preamble and the Basic Structure, and its interpretation, Fundamental Rights and Duties and their interpretation, State Policy Principles

UNIT - II: UNION GOVERNMENT

- Structure of the Indian Union, President – Role and Power, Prime Minister and Council of Ministers, Lok Sabha and Rajya Sabha

UNIT - III: STATE GOVERNMENT & LOCAL ADMINISTRATION

- Governor – Role and Power, Chief Minister and Council of Ministers, State Secretariat, District Administration, Municipal Corporation, Zila Panchayat

UNIT - IV: ELECTION COMMISSION

- Role and Functioning, Chief Election Commissioner, State Election Commission

Text:

1. Ethics and Politics of the Indian Constitution by Rajeev Bhargava, Oxford University Press, New Delhi, 2008
2. The Constitution of India by B.L. Fadia Sahitya Bhawan; New edition (2017)
3. Introduction to the Constitution of India by DD Basu Lexis Nexis; Twenty-Third, 2018 edition

Suggested Software/Learning Websites:

1. Ministry of Law and Justice - Constitution of India: www.legislative.gov.in
2. Constitution of India (Full Text): https://www.constitutionofindia.net/
3. Parliament of India: http://parliamentofindia.nic.in/
4. Official Website of the President of India: https://presidentofindia.nic.in/
5. Prime Minister's Office: https://pmindia.gov.in/
6. State Government Websites: https://www.maharashtra.gov.in/
7. Indian Legal System - Overview: http://www.legalservicesindia.com
8. https://www.constitution.org/cons/india/const.html
9. http://www.legislative.gov.in/constitution-of-india
10. https://www.sci.gov.in/constitution

ADDITIONAL COURSE – HINDI (उद्यमिता का परिचय - II)

Semester II **AEC 103**	**Paper 6: Hindi** (उद्यमिता का परिचय - II)	**1L:1T:0P**	**02 Credits** **50 Marks** **(00 UA + 50 CA)**

Course Objective: To know about Entrepreneurship and ethical responsibility in detail.

यह पाठ्यक्रम आपको कंप्यूटर विज्ञान के क्षेत्र में उद्यमिता के साथ-साथ हिंदी भाषा में तकनीकी समझ और व्यावसायिक क्षमताओं का विकास करने में सहायता करेगा। हिंदी एक महत्वपूर्ण भारतीय भाषा है और इसके माध्यम से कंप्यूटर और उद्यमिता को समझने से आप व्यापक भारतीय परिप्रेक्ष्य में अपनी दक्षता बढ़ा सकेंगे। इस तरह का परिचयात्मक वाक्यांश छात्रों को यह समझाने में मदद करेगा कि हिंदी में इस विषय को सीखने का महत्व क्या है और यह किस प्रकार उनकी व्यावसायिक और तकनीकी दक्षताओं को समृद्ध कर सकता है।

UNIT - I: विपणन और बिक्री रणनीतियाँ (Marketing and Sales Strategies)

डिजिटल मार्केटिंग के माध्यम, कंप्यूटर आधारित उत्पादों की मार्केटिंग रणनीतियाँ, ग्राहक अनुभव और उपयोगकर्ता प्रतिक्रिया, बिक्री चैनल का चयन और प्रबंधन, ब्रांडिंग और सोशल मीडिया का प्रभाव

UNIT - II: कानूनी और नैतिक जिम्मेदारियाँ (Legal and Ethical Responsibilities)

उद्यमिता के कानूनी ढांचे और नियम, स्टार्टअप्स के लिए पंजीकरण प्रक्रिया, कॉपीराइट, पेटेंट और ट्रेडमार्क, डेटा सुरक्षा और गोपनीयता नियम, नैतिक व्यापार प्रथाओं का पालन

UNIT - III: प्रबंधन कौशल (Management Skills)

नेतृत्व और टीम प्रबंधन, समय प्रबंधन और प्रोजेक्ट प्रबंधन, संचार कौशल और नेटवर्किंग, जोखिम और संकट प्रबंधन, कर्मचारी और संसाधन प्रबंधन

UNIT - IV: भविष्य की संभावनाएँ और केस स्टडीज (Future Opportunities and Case Studies)

आर्टिफिशियल इंटेलिजेंस, डेटा साइंस, और क्लाउड कंप्यूटिंग में उद्यमिता के अवसर, सफल कंप्यूटर उद्यमियों के केस स्टडीज, उद्यमिता में भविष्य की चुनौतियाँ और समाधान, ग्लोबल और लोकल मार्केट में कंप्यूटर उद्यमिता की भूमिका, एक वास्तविक व्यवसाय मॉडल का निर्माण और प्रस्तुति

BOOKS:

1. स्टार्टअप इंडिया - उद्यमिता का नया दौर", अशोक कुमारी, प्रभात प्रकाशन
2. उद्यमिता विकास और प्रबंधन, बी.एल. गुप्ता, वर्धमान प्रकाशन

Alternative NPTEL/SWAYAM Course: Students may take courses on Indian or foreign subjects through platforms like NPTEL or SWAYAM and must submit the result before the start of University examination.

SEMINAR

Semester II SEC 104	**Paper 7: Seminar**	**1L:0T:0P**	**01 Credits 25 Marks (00 UA + 25 CA)**

COURSE OUTCOMES

- CO1: To analyze a current topic of professional interest and present it before the audience.
- CO2: To familiar with basic technical writing concepts and terms, such as audience analysis, jargon, format, visuals, and presentation and acquired the basic skills to for performing literature survey and paper presentation.
- CO3: To improve skills to read, understand, and interpret material on technology.
- CO4: To improve communication and writing skills and prepare the report

The seminar must focus on current trends in IT, Computer Science, or Computer Applications. Each student is required to deliver a PowerPoint presentation accompanied by a written Seminar Report. Students are advised to adhere to the following guidelines when selecting and preparing their seminar topics.

Semester II: Fundamental Concepts

A student needs to select a topic from the list below or one that is somewhat related to this topic,

1. Wearable Technology: Smartwatches, fitness trackers, and their future
2. Introduction to Cyberbullying and Online Safety
3. Bluetooth Technology and Its Applications
4. Digital Payments and Fintech:
5. Social and Ethical Issues in Computing and the Internet
6. Open Source Software vs. Proprietary Software
7. Emerging Technologies: AI, Machine Learning, and Their Impact on Society
8. E-Governance: The Role of ICT in Public Administration
9. Digital Literacy
10. Digital Media: Types and Uses in Communication
11. Understanding Ergonomics in Computer Usage
12. Data Backup and Recovery Solutions
13. Social Media and Its Impact on Communication and Society
14. Introduction to Geographic Information Systems (GIS)
15. The Role of ICT in Disaster Management and Emergency Response

Guidelines to Seminar

1. Selection of Seminar Topic: The topic chosen must be based on the latest trends. Ensure that it is relevant and up-to-date.
2. Topic Approval: The seminar topic must be approved by the department-assigned guide before the deadline as per the university timetable.
3. Group Presentations: Students are allowed to present the seminar in groups of up to 3 members.
4. Presentation Aids: Students are encouraged to use graphical, animated, audio, and video aids to enhance their seminar presentations.
5. Evaluation: The seminar will be evaluated by an internal examiner appointed by the department.
6. Seminar Report Submission: Students must submit their seminar reports before the prescribed deadline with the approval of their respective guides. Failure to meet the deadline may result in appropriate action being taken against the student.
7. Report Format:
    a) The report should be printed on A4-size bond paper with 1.5 line spacing.
    b) Left margin: 1.5 inches, Right margin: 1.0 inch.
    c) The report must be properly spiral bound.
    d) Only one copy of the report needs to be submitted.
8. Certificates and Declarations: Students are required to include the necessary certificates and declarations, duly signed, and enclosed in their reports.

Appendix 1

Discipline-Specific Electives (DSE)

A student must select one of the following disciplines to study throughout their semesters.

1. **DATA SCIENCE**
2. **ARTIFICIAL INTELLIGENCE & MACHINE LEARNING**
3. **FULL STACK DEVELOPMENT**

Appendix 2

Evaluation Rules

1. The College/Internal Assessment marks shall be awarded by the concerned teacher/Head of Dept.
2. The College/Internal Assessment marks shall be sent to the University after the Assessment in theprescribed format and as directed/notified by the University.
3. General guidelines for College/Internal Assessment are:
    a) The College / Internal Assessment marks assigned to each theory paper on the basics of the performance in **minimum two activities (Apart from one compulsory activity) in <u>Every Semester</u>** as described below and selected by the concerned teacher and same must be conveyed to students at the beginning.
        1. **Unit Test / Open Book Test / Model Examination** (**Compulsory Activity)**
        2. Certification from IIT Spoken Tutorial / Swayam / NPTEL / PARAKH / AACST / Certificate courses run by University/College etc.
        3. Online Course Completion (Coursera, Udemy, MMTTC etc.)
        4. Participation in Online/Offline: Quiz's / Presentation / Poster Competition / Debate
        5. Participation in Departmental Activities Event / Program / Club
        6. Theory Assignments / Programming Assignments
        7. Study tour / Industrial Visits / Field Work
        8. Mentorship Program Participation
        9. Community Service Projects
        10. Participation in Coding Competitions
        11. Creating Educational Content (Blogs, Videos, Website, etc.)
        12. Organizing Tech Talks or Seminars
        13. Developing Mobile or Web Apps
        14. Contributions to Open Source Projects
        15. Start-up Idea Presentation
        16. Involvement in Cultural/Sports Events organized by College, University, State, etc.
        17. Publishing Research Paper / Review Paper
        18. Participation in Seminar/Workshop organized by the university / Other College / or any Associations.
        19. Participation in National Level / State level /University Level program/event like Avishkar, Participation in Hackathons etc.
    b) The concerned teacher/department/college shall have to keep a record of all the above activities until six months after the declaration of the results of that semester.

A) Practical Assessment:

Time: Minimum 2 Hours 30 Min. for conducting the practical examination subject to the condition of the availability of computers and printers at the center.

Marks Distribution: A practical mark will be allocated together by the Internal & External Examiner as per the following format on the date of Examination as notified by college/university.

Sr. No.	Particulars	Max. Marks (% of Marks)	
		College Assessment (CA)	University Assessment (UA)
1.	Solving/Writing, Execution, and Printout of Program / Problem - I	40%	40%
2. .	Writing Problem/Program - II	20%	20%
3. .	Practical Record	20%	20%
4. .	Viva Voce	20%	20%

Note:1) The Written work should be completed within max. 45 minutes.

2) For execution and taking printout max. 45 minutes is reserved.

B) Paper Assessment: Theory papers will be held as per the schedule given by the university and the examinee needs to score a minimum of 40% of marks to clear the paper. While in College assessment marks and in practical students' needs to score min. 50% for passing.

Appendix 3

Practical Examination

1. Each practical carry 50 marks. The question should be asked from the list of practical as given in the syllabi of respective subjects.
2. Practical performance shall be jointly evaluated by the External and Internal Examiner. A practical mark will be submitting by the Internal & External Examiner on the date of Examination.
3. Incase of discrepancy, the External Examiner's decision shall be final.
4. The duration of the practical examination will be a Minimum of 2 Hours and 30 Min.
5. The Practical Record of every student shall carry a certificate as shown below, duly signedby the teacher-in-charge and the Head of the Department. If the student fails to submit his/ her certified Practical Record duly signed by the Teacher-In-Charge and the Head of the Department, he/she shall not be allowed to appear for the Practical Examination and no Marks shall be allotted to the student.
6. The certificate template shall be as follows:

C E R T I F I C A T E

Name of the College / Institution: _

Name of the Department: _

This is to certify that this Practical Record contains the bonafide record of the practical work of Mr. / Mrs. / Ku. _____ of BCA _ _ _ _ Semester _ _ _ _ _ during the academic year _____ _.

The candidate has satisfactorily completed the practical's prescribed for the course by Gondwana University, Gadchiroli for the subject _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

Dated : _ _ / _ _ / _ _ _ _

Signature of the teacher who taught the examinee

1._ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

2._ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

Head of the Department

Appendix 4

The Pattern of Question Paper

General Rules and Regulations regarding a pattern of question paper for the semester-end examination is as given below:

1. The maximum marks for each theory paper will be 60 (Three Hours) or 40 (Two Hours).
2. There will be four units in each paper with equal marks weightage to each unit.
3. First Four questions will be based on four units with internal choice of either 6 or 4 marks depending upon total marks i.e. either 60 or 40.
4. The fifth question will be compulsory, consisting of one question from each of the four units, and there will be no internal choice having either worth 4 or 2 marks.

Bachelor of Computer Application

BCA I/II/III/IV Semester – I/II/III/IV/V/VI/VII/VIII

Paper No and Name of Paper

Time: 3 / 2 Hours] **[Max. Marks: 60 / 40**

Note: 1) All questions are compulsory and carry equal marks.

2) Draw Neat and Labeled diagrams and use supporting data wherever necessary.

3) Avoid vague answers and write specific points/answers related to questions.

Q 1	
Either (From Unit - I)	
a)	*6/4*
b)	*6/4*
Or	
c)	*6/4*
d)	*6/4*
Q 2	
Either (From Unit - II)	
a)	*6/4*
b)	*6/4*
Or	
c)	*6/4*
d)	*6/4*
Q 3	
Either (From Unit - III)	
a)	6/4
b)	6/4
Or	
c)	6/4
d)	6/4
Q 4	
Either (From Unit - IV)	
a)	6/4
b)	6/4
Or	
c)	6/4
d)	6/4
Q 5 Attempt all the questions below	
a) (From Unit - I)	3/2
b) (From Unit - II)	3/2
c) (From Unit - III)	3/2
d) (From Unit - IV)	3/2