

SYLLABUS PRESCRIBED FOR
B.Sc. CYBER SECURITY
(Three Year Degree Course)

PROGRAM EDUCATIONAL OBJECTIVES (PEO's):

PEO 1: Graduates will demonstrate a deep understanding of cyber-security principles, practices, and technologies.

PEO 2: Graduates will possess critical thinking and problem-solving skills to analyze and solve complex cyber-security issues.

PEO 3: Graduates will exhibit effective communication skills, both oral and written, to convey cyber-security concepts and findings to diverse audiences.

PEO 4: Graduates will demonstrate ethical and professional behavior in their cyber-security practice, adhering to legal and moral standards.

PEO 5: Graduates will engage in lifelong learning and professional development to adapt to evolving cyber-security threats and technologies.

PROGRAM OUTCOMES (PO's):

PO 1: Ability to apply principles of cyber-security to design, implement, and manage secure computing systems.

PO 2: Proficiency in identifying and analyzing cyber-security risks, vulnerabilities, and threats in various technological contexts.

PO 3: Competence in employing cyber-security tools, techniques, and methodologies to protect information assets and ensure data integrity, confidentiality, and availability.

PO 4: Capability to evaluate and recommend cyber-security solutions aligned with organizational needs, compliance requirements, and industry best practices.

PO 5: Understanding of legal, ethical, and societal issues related to cyber-security, and ability to make informed decisions considering these factors.

PROGRAM SPECIFIC OUTCOMES (PSO's):

PSO 1: Ability to apply cryptographic techniques and protocols to secure data transmission and storage.

PSO 2: Proficiency in conducting risk assessments, penetration testing, and forensic analysis to detect and mitigate cyber-security incidents.

PSO 3: Competence in designing and implementing secure network architectures and protocols to safeguard against cyber threats.

PSO 4: Capability to utilize threat intelligence, security analytics, and incident response techniques to detect and respond to cyber-security breaches effectively.

PSO 5: Understanding of emerging trends and technologies in cyber-security, and ability to adapt and integrate them into organizational cyber-security strategies.

EMPLOYABILITY SKILLS:

After completing a Bachelor of Science (BSc) in Cyber Security, there are numerous employment opportunities available across various sectors. Here are some potential career paths:

1. **Cyber-security Analyst/Consultant:** Entry-level positions where you analyze and assess security threats, implement security measures, and develop strategies to protect an organization's digital assets.
2. **Security Operations Center (SOC) Analyst:** Monitoring and analyzing security events and incidents within an organization's IT infrastructure to detect, respond to, and mitigate cyber threats.
3. **Penetration Tester/Ethical Hacker:** Conducting controlled attacks on systems, networks, and applications to identify vulnerabilities and weaknesses, and providing recommendations to improve security.
4. **Security Engineer:** Designing, implementing, and maintaining security solutions such as firewalls, intrusion detection systems, encryption systems, and access controls.
5. **Security Consultant:** Providing advisory services to organizations on cyber-security strategies, risk management, compliance, and regulatory requirements.
6. **Incident Responder:** Investigating and responding to security incidents, coordinating incident response efforts, and implementing measures to prevent similar incidents in the future.
7. **Security Administrator:** Managing and maintaining security infrastructure, including configuring security settings, administering access controls, and enforcing security policies.
8. **Forensic Analyst:** Investigating cybercrime incidents, collecting and analyzing digital evidence, and providing expert testimony in legal proceedings.
9. **Security Architect:** Designing and implementing secure IT architectures, considering business requirements, risk factors, and emerging technologies.
10. **Cyber-security Educator/Trainer:** Teaching cyber-security concepts, tools, and techniques to students or employees through academic institutions, training programs, or corporate workshops.

SEMESTER I**COURSE TITLE: ENGLISH COMPOSITION AND COMMUNICATION****COURSE OBJECTIVE:**

1. To train and prepare the students to seek and find employment in various field.
2. To develop communicative competence in students
3. To impart knowledge, ideas and concepts in the technicalities of proper pronunciation, structure, appropriate use and style of the English language as well as the application areas of English Communication.
4. To expose the students to the employment opportunities, challenges and job roles.

COURSE OUTCOME:

At end of the course students would be able to:

1. understand communication skills of English language
2. Formulate/ compose his own sentences and able to speak English Language.
3. collaborate with others students in English.
4. communicate properly their ideas and concepts in English.

Unit	Content
Unit 1:	<ul style="list-style-type: none"> ○ Articles ○ Prepositions ○ Tenses ○ Subject – Verb Agreement (6 Hours)
Unit 2:	<ul style="list-style-type: none"> ○ Meeting People ○ Exchanging Greetings and Taking Leave ○ Introducing Yourself (6 Hours)
Unit 3: Prose	<ul style="list-style-type: none"> ○ The Home Coming – Rabindranath Tagore ○ A Lesson My Father Taught Me – APJ Abdul Kalam ○ How I Became a Public Speaker – George Bernard Shaw (6 Hours)
Unit 4: Poetry	<ul style="list-style-type: none"> ○ The quality of Mercy – William Shakespeare ○ The Mountain and the Squirrel – R.W. Emerson ○ Where the Mind is Without Fear – Rabindranath Tagore (6 Hours)
Unit5: Skill Enhancement	<ul style="list-style-type: none"> ○ Spot Visit and preparing a report – Visit to Super Market, Bus Stand, Railway Station, Bank, Medical Shop, Bakery etc. ○ Interview of a dignitary and writing a report in dialogue form (6 Hours)

TEXT BOOK:

Pathmaker: A Textbook for College Students [ISBN 989354421778] Edited by Board of Editors, SantGadge Baba Amravati University, Amravati. Publisher: Orient Black Swan Pvt Ltd

COURSE TITLE: ELEMENTS OF COMPUTER**COURSE OBJECTIVES:**

To provide overview of subjects in Computer Science and Engineering.

COURSE OUTCOMES:

1. Know the working principles of functional units of a basic Computer.
2. Understand program development, the use of data structures and algorithms in problem solving.
3. Know the need and types of operating system, database systems.
4. Understand the significance of networks, internet, WWW and cyber security.
5. Understand Autonomous systems, the application of artificial intelligence.

Unit	Content
UNIT – I Basics of a Computer	Hardware, Software, Generations of computers. Hardware - functional units, Components of CPU, Memory – hierarchy, types of memory, Input and output devices. Software – systems software, application software, packages, frameworks, IDEs. (6 Hours)
UNIT – II Software development	waterfall model, Agile, Types of computer languages – Programming, markup, scripting Program Development – steps in program development, flowcharts, algorithms, data structures – definition, types of data structures (6 Hours)
UNIT – III Operating systems	Functions of operating systems, types of operating systems, Device & Resource management Database Management Systems: Data models, RDBMS, SQL, Database Transactions, data centers, cloud services (6 Hours)
UNIT – IV Computer Networks	Advantages of computer networks, LAN, WAN, MAN, internet, WiFi, sensor networks, vehicular networks, 5G communication. World Wide Web – Basics, role of HTML, CSS, XML, Tools for web designing, social media, online social networks. Security – information security, cyber security, cyber laws (6 Hours)
UNIT – V Autonomous Systems	IoT, Robotics, Drones, Artificial Intelligence – Learning, Game Development, natural language processing, image and video processing. Cloud Basics (6 Hours)

TEXT BOOK:

1. Invitation to Computer Science, G. Michael Schneider, Macalester College, Judith L. Gersting University of Hawaii, Hilo, Contributing author: Keith Miller University of Illinois, Springfield.

REFERENCE BOOKS:

1. Fundamentals of Computers, Reema Thareja, Oxford Higher Education, Oxford University Press.
2. Introduction to computers, Peter Norton, 8th Edition, Tata McGraw Hill.
3. Computer Fundamentals, Anita Goel, Pearson Education India, 2010. 4. Elements of computer science, Cengage

COURSE TITLE: COMPUTER ORGINAZATION AND ARCHITECTURE**COURSE OBJECTIVE:**

1. To understand the basic Computer architecture
2. To familiarize with arithmetic and logic unit and implementation of different arithmetic operations.
3. To understand the concept of pipelining and parallelism
4. To know the difference types of memory and related performance issues.
5. To understand the concepts of Memory and IO devices.

COURSE OUTCOME:

Upon completion of this course, the students will be able to

1. Identify the component of the basic computer architecture.
2. Demonstrate binary operations in ALU
3. Demonstrate theoretically the concept of pipelining and parallelism.
4. Appreciate the difference between Cache and Virtual memory and related performance issues.
5. Value the performance difference between and different memory devices and IO.

Unit	Content
Unit 1: - Introduction	Eight ideas – Components of a computer system – Technology – Performance – Power wall – Uniprocessors to multiprocessors; Instructions – operations and operands – representing instructions – Addressing and addressing modes. (9 Hours)
Unit 2: - Arithmetic For Computers	ALU - Integer Addition, Integer Subtraction, Dealing/Detecting with Overflow - Designing ALU for MIPS, Multiplication- Multiply Algorithm-Optimized Multiplier- Faster Multiplier, Division-Divide Algorithm-Optimized Divider – Floating Point Operations-Standard- IEEE Floating-Point Format. (9 Hours)
Unit 3: - MIPS And Pipelining	Basic MIPS implementation – Building data path – Control Implementation scheme – Pipelining – Pipelined data path and control – Handling Data hazards & Control hazards –Exceptions (9 Hours)
Unit 4: - Instruction Level Parallelism	Instruction-level-parallelism – Parallel processing challenges – Flynn's classification – Hardware multithreading – Multicore processors (9 Hours)
Unit 5: - Memory And I/O	Memory hierarchy - Cache Memory - Virtual memory, TLBs - Input/output system, programmed I/O, DMA and interrupts, I/O processors. (9 Hours)

TEXT BOOKS: -

David A. Patterson and John L. Hennessy, "Computer organization and design", Morgan Kaufmann / Elsevier, Fifth edition

REFERENCE BOOKS: -

1. William Stallings, "Computer Organization and Architecture", Tenth Edition, Pearson Education, 2016.
2. V. Carl Hamacher, Zvonko G. Varanescic and Safat G. Zaky, "Computer Organisation", VI th edition, Mc Graw-Hill Inc, 2012.
3. Vincent P. Heuring, Harry F. Jordan, "Computer System Architecture", Second Edition, Pearson Education, 2005.

COURSE TITLE: FUNDAMENTALS OF COMPUTER PROGRAMMING**COURSE OBJECTIVES:**

1. Learn how to write modular and reusable code, enabling students to design and implement complex software systems with clear structure and maintainability.
2. Acquire proficiency in the C programming language.
3. Enhance problem-solving skills through hands-on exercises and projects, where students apply programming principles and techniques to solve real-world problems.
4. Develop an awareness of effective programming practices.
5. Develop a solid understanding of fundamental programming concepts.

COURSE OUTCOMES:

1. learn the advance concepts of programming-like structure, string handling, file handling.
2. Formulate simple algorithms for arithmetic and logical problems
3. Translate the algorithms to programs (in C language)
4. build the basic skills of programming.
5. acquire the importance of C programming using various methodologies.

Unit	Content
Unit I: The Basics of Programming	Problem Solving Through Programs- Instructions and Programs, Designing Algorithms/Pseudo Code, Flowchart, Programming Languages and Their Types, Assemblers, Compilers, Interpreters, Program Design, Coding, Compilation, Execution, Testing, Debugging, Documentation; Programming Paradigms: Imperative, Declarative, Procedural, Object Oriented, Advantages and Disadvantages; Programming Approaches – Top Down, Bottom Up, Structured Programming, Features (9 Hours)
Unit II: C Programming	Character set, Tokens- Data Types, Identifiers, Variables, Constants; Input / Output Statements, format specifiers and Escape sequences; Operators and their types, Precedence and Associativity of Operators, Type Conversions- Implicit and Explicit. Control structures: if, if-else, nested if, if-elseif-else, Switch statement, for, while, do-while, nested loops, break, continue, goto. (9 Hours)
Unit III: Arrays, Functions and Pointers using C	Arrays, dimensions of arrays, Character and String arrays; Modular Programming with Functions- Functions and Parameters, Defining and calling functions, Function calls by Value and Reference, return statement, Recursion; Pointer variables, address and indirection operators, Pointer assignment, Pointer Arithmetic, Pointer-as-argument, Pointer-as-return values, Using pointers for array processing (9 Hours)
Unit IV: Strings, Structures and Unions, Memory Allocation in C	String literals, variables, Reading and writing strings, operations on strings. Structures: prototype, Array of structures, Passing Structures to functions, nested Structure; Union, Dynamic Memory Allocation, Deallocation (9 Hours)
Unit V: The Preprocessor and File Handling in C	The Preprocessor, Preprocessor Directives, Macro definitions, general properties of macros, #define; File Handling: Introduction to Files, File opening modes, file operations, command line arguments, Random access files, File pointer, Input/Output Functions. (9 Hours)

TEXT BOOK:

1. Brian W. Kernighan, Dennis M. Ritchie, C Programming Language, 2nd Edition Prentice Hall
2. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill
3. E. Balaguruswamy, Programming in ANSI C, Tata McGraw-Hill

REFERENCE BOOKS:

1. Yashwant Kanetkar, Let us C, 2nd edition, BPB publication, New Delhi, India, (1995).
2. K.R.Venugopal, S.R. Prasad, Mastering C, Tata Mc Graw- Hill ,New Delhi, India, (2008).
3. D. Ravichandran, Programming with C, First Edition,New Age Inetrnational Publication Limited, New Delhi, 2006
4. Sudhir Dawra, Mastering Graphics Programming in C, First Edition,Firewall MediaLaxmi Publications Private Limited, New Delhi, 2004.

COURSE TITLE: BASIC OF CYBER SECURITY**COURSE OBJECTIVE:**

This course provides the foundation for understanding the key issues associated with protecting information assets. The purpose of the course is to provide the student with an overview of the field of information security and assurance.

COURSE OUTCOME:

1. Understand the broad set of technical, social & political aspects of Cyber Security.
2. Appreciate the vulnerabilities and threats posed by criminals, terrorist and nation states to national infrastructure.
3. Understand the importance of ethical hacking tool.
4. Understanding the ethical hacking process.
5. Implementing ethical hacking tools in an organization.
6. Apply security principles to system design.

Unit	Content
Unit I: Introduction	Introduction to Cyber Security - Importance and challenges in Cyber Security - Cyberspace - Cyber threats - Cyber warfare - CIA Triad - Cyber Terrorism - Cyber Security of Critical Infrastructure - Cyber security -Organizational Implications. (9 Hours)
Unit II: Hackers And Cyber Crimes	Types of Hackers - Hackers and Crackers - Cyber-Attacks and Vulnerabilities - Malware threats - Sniffing - Gaining Access - Escalating Privileges - Executing Applications - Hiding Files - Covering Tracks - Worms - Trojans - Viruses - Backdoors (9 Hours)
Unit III: Ethical Hacking and Social Engineering	Ethical Hacking Concepts and Scopes - Threats and Attack Vectors - Information Assurance - Threat Modeling - Enterprise Information Security Architecture - Vulnerability Assessment and Penetration 22 Testing - Types of Social Engineering - Insider Attack - Preventing Insider Threats - Social Engineering Targets and Defence Strategies. (9 Hours)
Unit IV: Cyber Forensics & Auditing	Introduction to Cyber Forensics - Computer Equipment and associated storage media - Role of forensics Investigator - Forensics Investigation Process - Collecting Network based Evidence - Writing Computer Forensics Reports - Auditing - Plan an audit against a set of audit criteria - Information Security Management System Management. Introduction to ISO 27001:2013. (9 Hours)
Unit V: Cyber Ethics & Laws	Introduction to Cyber Laws - E-Commerce and E-Governance - Certifying Authority and Controller - Offences under IT Act- Computer Offences and its penalty under IT Act 2000 - Intellectual Property Rights in Cyberspace. (9 Hours)

TEXT BOOK:

1. "Introduction to Computer Security" by Matt Bishop
2. "Hacking: The Art of Exploitation" by Jon Erickson
3. "Computer Forensics: Investigating Network Intrusions and Cyber Crime" by EC-Council

REFERENCE BOOK:

1. "Cyber-security Essentials" by Charles J. Brooks
2. "The Web Application Hacker's Handbook: Finding and Exploiting Security Flaws" by Dafydd Stuttard and Marcus Pinto
3. "Social Engineering: The Science of Human Hacking" by Christopher Hadnagy
4. "Guide to Computer Forensics and Investigations" by Bill Nelson, Amelia Phillips, and Christopher Stuart
5. "Cyberlaw: Problems of Policy and Jurisprudence in the Information Age" by Patricia Bellia, Paul Berman, Brett Frischmann, and David Post
6. "Cybercrime and Digital Forensics: An Introduction" by Thomas Holt and Adam Bossler

COURSE TITLE: LAB BASED ON 1CS4**List of practical:**

NOTE: The list suggests the program set. Hence, the concerned staff may modify the list as needed (minimum 13 Practical).

1. Install and study the C programming environment
2. Implement C programs using arithmetic operators to solve given arithmetic operations
3. Implement minimum two C programs using Relational and conditional operator.
4. Implement minimum two C programs using Logical Operators
5. Implement minimum two C programs using simple If statement and if.....else statement.
6. Implement minimum two C programs using nested If-else statement and if...else if ladder e.g.- Write and Execute the C program to print the grades of students based on percentage. Grade: Distinction If per>=75
Grade: A If per>=60 and Per=55 and Per=40 and Per
7. Develop C program using Switch statements
8. Write a C program to print English Calendar months as per given number (e.g. If input is 4 then print "April") using Switch statement
9. Implement minimum two C programs using 'while' loop and 'do...while' loop statements.
10. Implement C programs using for loop statement (e.g.- Write a C Program to print numbers from 1 to 100)
11. Print various patterns using loops. e.g. - Write C Program to print following or similar pattern

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     * *
    * * *
   * * * *

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12. Implement C programs using One Dimensional Array. (e.g.-Write C program to input 5 numbers using array and display sum of it)
13. Implement C programs using Two-Dimensional Array. (e.g.-Write C program to calculate addition of two 3X3 matrices.
14. Write C program to perform following operations without using standard string functions. i) Calculate Length of given string ii) Print reverse of given string.
15. Implement 'Structure' in C (e.g. - Add and Subtract complex numbers using structure)
16. Implement 'Array of Structure' in C (e.g.-Accept and Display 10 Employee information using structure)
17. Write C program to demonstrate User defined Functions
18. Implement recursive functions in C program.
19. Write C Program to print addresses and values of variables using Pointer. (e.g.- Write C program to access and display address of variables.)
20. Implement C Programs to perform arithmetic operations using Pointer.

COURSE TITLE: COMPUTER HARDWARE AND NETWORK – LAB**COURSE OBJECTIVE:**

The objective of this lab course is to provide hands-on experience with computer hardware components and networking concepts. Students will gain practical skills in assembling, configuring, and troubleshooting computer systems, as well as designing and implementing basic computer networks.

COURSE OUTCOME:

1. Gain practical experience in assembling and disassembling computer hardware components.
2. Develop proficiency in installing and configuring operating systems and device drivers.
3. Understand the principles of network design, configuration, and troubleshooting.
4. Demonstrate the ability to set up and manage basic computer networks.
5. Acquire skills in diagnosing and resolving hardware and network-related issues.

LIST OF PRACTICAL:

NOTE: The list suggests the program set. Hence, the concerned staff may modify the list as needed (minimum 13).

1. To Assemble a Desktop Computer: Assemble hardware components into a desktop unit.
2. To Install an Operating System: Install Windows or Linux onto a computer system.
3. To Set Up Device Drivers: Configure and install drivers for hardware components.
4. To Configure BIOS/UEFI Settings: Adjust settings in BIOS/UEFI firmware.
5. To Partition and Format Disks: Divide and format hard drives for data storage.
6. To Configure Basic Network Settings: Set up IP addresses and network configurations.
7. To Crimp Cables and Test Connectivity: Create network cables and ensure proper connectivity.
8. To Set Up a Wireless Network: Configure Wi-Fi network with routers and access points.
9. To Configure Network Devices: Set up switches and routers for network communication.
10. To Troubleshoot Network Connectivity: Identify and resolve common network issues.
11. To Set Up Network File Sharing: Enable file sharing and permissions on a network.
12. To Establish Remote Desktop Connections: Connect to remote computers via desktop sharing.
13. To Configure Network Printers: Set up printers for shared printing on a network.
14. To Configure a Basic Firewall: Implement basic firewall rules for network security.
15. To Perform Hardware Diagnostics and Maintenance: Use diagnostic tools and perform routine hardware maintenance.

COURSE TITLE: DATA COMMUNICATION AND NETWORKING**COURSE OBJECTIVE:**

1. Understand network & can identifying benefits of networks.
2. Understand and describe communication media.
3. Able to handle Computer Network.
4. To develop a small Computer Network.

COURSE OUTCOME:

1. Demonstrate comprehension of fundamental concepts in data communication and networking, including the OSI model, TCP/IP protocol suite, and network topologies.
2. Analyze various networking protocols and standards, such as Ethernet, Wi-Fi, and IPv4/IPv6, to understand their functions, advantages, and limitations.
3. Design simple to moderately complex computer networks, considering factors such as scalability, reliability, and security requirements.
4. Configure networking devices including routers, switches, and firewalls, for basic and advanced network functionalities.
5. Diagnose and troubleshoot common network problems using appropriate tools and techniques, such as packet analyzers and network monitoring software.

Unit	Content
<p>UNIT I: Introduction to Data Communication and Networking</p>	<p>Introduction, Fundamental Concepts, Data Communication, protocols, Standards, Standard organizations, Bandwidth and Data Transmission Rate.</p> <p>Analog Signal, Analog Transmission, Digital Signal, Digital Transmission, Digital Signal Analog Transmission, Baud Rate and Bits per second.</p> <p>Modes of Data Transmission and Multiplexing, Parallel and Serial Communication, Asynchronous, Synchronous and Isochronous Communication, Simplex, Half-Duplex, Full Duplex, Multiplexing and Demultiplexing, Types of Multiplexing: TDM, FDM, TDM Vs FDM(9 Hours)</p>
<p>UNIT II: Transmission Errors: Detection and Correction, Transmission Media and Network Topologies</p>	<p>Introduction, Error Classification, Types of Errors and Error Detection</p> <p>Types of Transmission Media- 1) Guided Media: Cable Characteristics, Types of Cable-Twisted Pair Cable, Co-axial Cable, Fiber Optic Cable. 2) Unguided media: Types of Communication Band-Microwave Communication, Radio wave Communication, Satellite Communication, Infrared Communication.</p> <p>Introduction IEEE Standards for LAN, MAN and WAN 802.1, 802.2, 802.3, 802.4, 802.5, 802.11</p> <p>Latest Technologies in Wireless Network-Bluetooth Architecture, Wi-Fi, Wi- Max Cellular (Mobile) Telephone - Band in Cellular Telephony, Calls using Mobile Phones, Transmitting receiving / Handoff operations</p> <p>Network Topologies, Switching: Packet, Circuit, Introduction Star, Ring, Tree, Bus, Mesh, Hybrid, Basics of Switching, Router. (9 Hours)</p>
<p>UNIT III: OSI Model, LAN, WAN, MAN, MAC Sublayer</p>	<p>Introduction– Layered Architecture, Peer-to- Peer Processes- Interfaces between Layer, Protocols, Organization of the Layers, Encapsulation.</p> <p>Layers of the OSI Reference Model (Functions of each Layer & Protocols used) – Physical Layer, Data-Link Layer, Network Layer, Transport Layer, Session Layer, Presentation Layer, Application Layer.</p> <p>LAN, Ethernet, Virtual LAN, Fast and Gigabit Ethernet, Token Ring, FDDI, Comparison of Ethernet, Token Ring FDDI, MAN, Distributed Queue Dual Bus, SMDS, WAN and its architecture, WAN transmission Mechanism, WAN Addressing. (9 Hours)</p>
<p>UNIT IV: Internetworking Concepts, Devices, Internet Basics, History and Architecture</p>	<p>Introduction–Why Internetworking, Problems in Internetworking, Dealing with Incompatibility, Visual Network, Internetworking Devices, Repeaters, Bridges, Routers, Gateways</p> <p>Brief History of Internet, Growth of Internet, Internet Topology, Internal Architecture of ISP.</p> <p>Ways of Accessing the Internet: Introduction, Dial Up access for an Individual User, Leased Lines, DSL and Cable Modems(9 Hours)</p>
<p>UNIT V: TCP/IP, ARP, RARP and ICMP, TCP vs UDP, DNS, Email, FTP</p>	<p>Introduction, TCP/IP Basics, Why IP addresses, Logical Addresses, Concept of IP Address and IP datagram Packet, ARP, RARP, ICMP, Data Fragmentation and Reassembly, Comparison of OSI and TCP/IP Protocol Suites.</p> <p>TCP and UDP: Introduction, TCP Basics, Features of TCP, Relationship between TCP and IP, Ports and Sockets, Connections, TCP Connections, Packet Format, Persistent TCP Connection, UDP and UDP Packet.</p>

	Introduction DNS, TCP, FTP TFTP(9 Hours)
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REFERENCE BOOKS:

Sr. No.	Title	Author	Publisher
1	Data Communications and Networks	Achyut S. Godbole	Tata McGraw Hill
2	Data Communications and Networking (Forth Edition)	Behrouz A. Forouzan	Tata McGraw Hill
3	Complete Reference Networking	Craig Zacker	Tata McGraw Hill
4	Computer Networking	Tularam M Bansod	Dreamtech, Wiley
5	Networking + Certification (Second Edition)	Microsoft Press	PHI (Prentice-Hall of India Private Limited)
6	Computer Network by	Andrew S. Tanenbaum	Pearson

COURSE TITLE: CYBER ETHICS**COURSE OBJECTIVE:**

This course provides understanding of cyber ethics, governance, and regulation by exploring ethical values and principles, the historical development of the Internet, and contemporary issues such as free speech, intellectual property, and privacy. Students will analyze the complexities of these topics, evaluate regulatory frameworks, and develop critical thinking skills to navigate ethical dilemmas in cyberspace.

COURSE OUTCOMES:

1. Understand the ethical values and principles underlying cyber activities.
2. understand the historical development and current governance structures of the Internet.
3. Evaluate the complexities of free speech and content control issues in cyberspace.
4. Examine the legal and moral dimensions of intellectual property in the digital realm.
5. Implementing the challenges and considerations in regulating internet privacy across different jurisdictions.

Unit	Content
Units I: The Internet and Ethical Values	Cyber ethics and the “Law of the Horse”, Iron Cage or Gateway to Utopia? Ethical Values and the Digital Frontier, Utilitarianism, Contract Rights (Contractarianism), Moral Duty (Pluralism), New Natural Law, Postscript on Moral Theory, Floridi’s Macro-ethics , Normative Principles: Autonomy, Nonmaleficence, Beneficence, Justice (6 Hours)
Unit II: Regulating and Governing the Internet	A Short History of the Internet, The Internet’s Current Architecture, The World Wide Web, Electronic Commerce, Gatekeepers and Search Engines, Social Networking, Social Problems and Social Costs: The Invisible Hand, Regulating the Net: The Visible Hand, A “Bottom-Up” Approach: The Power of Code, Internet Governance, Contested Sovereignty in Cyberspace (6 Hours)

<p>Unit III: Free Speech and Content Controls in Cyberspace</p>	<p>Speech and Internet Architecture, Pornography in Cyberspace: Public Policy Overview, Automating Content Controls, New Censors and Controversies. Hate Speech and Online Threats, Anonymous Speech, The Ethics of Blogging, Spam as Commercial Free Speech, Government Censorship and the Fate of Political Speech (6 Hours)</p>
<p>Unit IV: Intellectual Property in Cyberspace</p>	<p>Background on Intellectual Property What Is Intellectual Property? Legal Protection for Intellectual Property, Moral Justifications for Intellectual Property, Recent Legislation. Issues for the Internet and Networking Technologies: Copyright and the Digital Dilemma, Software Ownership and the Open-Source Code Movement, Digital Rights Architectures, Business Method Patents in Cyberspace, Patents and Smartphones, Domain Names and Interconnectivity Issues. (6 Hours)</p>
<p>Unit V: Regulating Internet Privacy</p>	<p>A Definition and Theory of Privacy, Personal Information on the Internet, Consumer Privacy on the Internet: Privacy-Invasive Technologies, Policy Considerations, Moral Considerations. The United States and the European Union: Divergent Paths to Privacy Protection Privacy Legislation in the United States, Privacy Protection in the European Union. A Prescription for Privacy? Privacy in the Workplace: Privacy Rights at Risk , Comparing U.S. and European Policies , The Case For and Against Monitoring (6 Hours)</p>

TEXT BOOK:

1. "CYBERETHICS Morality and Law in Cyberspace" by Richard A. Spinello.

REFERENCE:

1. "Ethics in Information Technology" by George Reynolds
2. "Digital Ethics: Rethinking Responsibility in Technology" by Jessica Powell

SEMESTER II**COURSE TITLE: COMMUNICATION SKILLS****COURSE OBJECTIVE:**

1. To train and prepare the students to seek and find employment in various field.
2. To develop communicative competence in students
3. To impart knowledge, ideas and concepts in the technicalities of proper pronunciation, structure, appropriate use and style of the English language as well as the application areas of English Communication.
4. To expose the students to the employment opportunities, challenges and job roles.

COURSE OUTCOME:

At end of the course students would be able to

1. Understand the paragraph, prose, poetry and communication skills .
2. Formulate/ compose his own sentences and able to speak English Language.
3. Collaborate with others students in English.
4. Communicate properly their ideas and concepts in English.

Unit	Content
Unit 1:	1) Question Tags 2) Synonyms and Antonyms 3) Prefixes, Suffixes, Zero Suffix and Infix (6 Hours)
Unit 2:	1) Making Requests and Responding to Requests 2) Thanking Someone and Responding to Thanks 3) Developing a Thoughts (6 Hours)
Unit 3:	1) On the Rule of the Road – A.G. Gardiner 2) A Simple Philosophy – Seathl 3) The Thief – Ruskin Bond (6 Hours)
Unit 4:	1) The World is Too Much with Us – William Wordsworth 2) Love’s Philosophy – P.B. Shelley 3) Success is Counted Sweetest – Emily Dickinson (6 Hours)
Unit 5:	1) Blog Writing 2) Presentation on a topic from prescribed prose/poem (6 Hours)

TEXT BOOKS: -

A Textbook for College Students [ISBN 989354421778] Edited by Board of Editors, Sant Gadge Baba Amravati University, Amravati Publisher: Orient Black Swan Pvt Ltd

COURSE TITLE: DIGITAL ELECTRONICS**COURSE OBJECTIVE:**

1. Gain a foundational understanding of digital systems, including binary arithmetic, Boolean algebra, and logic gates.
2. Learn to analyze and design combinational circuits using Boolean functions, Karnaugh maps, and truth tables.
3. Design and analyze sequential circuits, including flip-flops, counters, registers, and state machines.
4. Understand different logic families their characteristics, advantages, and limitations.
5. Apply knowledge of digital electronics to solve real-world problems in areas such as telecommunications, control systems, and digital signal processing.

COURSE OUTCOME:

Upon successful completion of the course, students would be able to

1. learn the binary numbers used in computer system.
2. understand how logic circuit works inside microprocessor.
3. understand concepts of digital systems.
4. understand how microprocessor works inside computer system.
5. use the concepts of assembly language programming.

Unit	Content
Unit I: Number systems	Decimal, Binary, Octal and Hexadecimal, Binary arithmetic Operation: addition, subtraction, multiplication and division, Compliments: 1's and 2's compliments, subtraction by 1's and 2's compliment method, Conversion: Binary to decimal, octal, hexadecimal conversion and vice versa. Octal to decimal, hexadecimal, binary conversion and vice-versa, hexadecimal to octal, decimal, Binary and vice versa. (6 Hours)
Unit II: Logic operation and logic gates	OR, AND, NOT, NAND, NOR, and EXOR, EX-NOR gates and their truth table. Combinational Logic Circuits: Half Adder, full adder, half Subtractor and full Subtractor. (6 Hours)
Unit III: Boolean Algebra	DeMorgan's Theorem, Boolean Laws, Reduction of Equation using Boolean Laws. K-Map: reduction of equation using K-Map, Multiplexer and De-multiplexer. (6 Hours)
Unit IV: Sequential Logic Circuits	Construction, working and Truth Table of RClocked R-S, JK, D and T- type, JKMS Flip Flop, Concept of preset and clear terminals, Race around Condition in JK FF. (6 Hours)
Unit V: Registers	SISO, SIPO, PISO, PIPO. Counters-4 bit Binary Up and Down Counter. 3 bit Binary Up-Down counter. (6 Hours)

TEXT BOOKS:

1. R. P. Jain: Modern Digital Electronics:4 Th edition Tata Mc-Graw Hill (2010)
2. A. Anand Kumar: Fundamental of Digital Circuits:2nd edition (PHI) (2003)
3. A. P. Malvino, D. P. Leach: Digital principles and applications 4th edition: McGraw Hill (1975)
4. B. Ram: Fundamental of Microprocessor and Microcomputer 6 th edition: Dhanpatrai Publication (2006)

REFERENCES BOOKS:

1. M. B. Matsagar, V.S. Kale: Principles of digital Electronics, Vision publication
2. Floyd, Jain: Digital fundamentals, Pearson
3. S. P. Bali, Y. N. Bapat: Electronic circuits and systems Analog and digital, Tata McGraw Hill
4. B. S. Nair: Digital electronics and logic design, Prentice Hall

COURSE TITLE: - DATABASE MANAGEMENT SYSTEM**COURSE OBJECTIVE:**

1. To understand the basics of database system
2. To learn Query Basics and SQL commands
3. To comprehend the concepts of storage structures, form design, usage of report
4. To apprehend the concepts of transaction management and recoverability
5. To gain knowledge on database architecture, directory system and network types.

COURSE OUTCOME:

Upon completion of this course, the students will be able to:

1. Create a normalized database for an organization.
2. Implement and test database queries for any real time data bases.

3. Formulate and design forms and reports for database applications.
4. Apply transactional management and concurrency control for a database transaction.
5. Recognize the features of client server architecture, distributed architecture, directory system and network types

Unit	Content
Unit 1: Introduction To Database Management System	Advantages and Components of a Database Management Systems - Feasibility Study – Class Diagrams - Data Types - Events - Normal Forms - Integrity - Converting Class Diagrams to Normalized Tables - Data Dictionary. (12 Hours)
Unit 2: Queries And Subqueries	Query Basics - Computation Using Queries - Subtotals and GROUP BY Command – Queries with Multiple Tables - Subqueries - Joins - DDL & DML - Testing Queries. (12 Hours)
Unit 3: File Storage, Forms and Reports	Storage and File Structure - RAID - File Organization - Indexing and Hashing - B Tree - B Tree Index files - Static and Dynamic Hashing - Effective Design of Forms and Reports - Form Layout - Creating Forms - Graphical Objects - Reports - Procedural Languages - Data on Forms- Programs to Retrieve and Save Data. (12 Hours)
Unit 4: Transaction And Concurrency Control	Transaction Management – Implementation of Atomicity and Durability – Serializability – Recoverability – Concurrency Control – Dead Lock Handling – Recovery System – Buffer Management. (12 Hours)
Unit 5: - Database Architecture and Distributed Database	Database – System Architecture – Client Server – Architectures – Parallel System – Network Types – Distributed Database – Homogeneous and Heterogeneous Database – Directory System – Case Study – Oracle – MSSQL Server (12 Hours)

TEXT BOOKS: -

1. A. Silberschatz, H.F. Korth and S. Sudharshan, "Database System Concepts" , Fifth Edition, Tata McGraw Hill, New Delhi, 2006.
2. G. V. Post, "Database Management Systems Designing and Building Business Application", McGraw Hill International edition, 1999

REFERENCE BOOKS: -

- 1 J. D. Ullman, "Principles of Database Systems", Galgotia Publishers, Second Edition, New Delhi, 1988
- 2 C.J. Date, An Introduction to Database Systems, Third Edition, Narosa, New Delhi, 1985

COURSE TITLE: - DATA STRUCTURE AND ALGORITHMS**COURSE OBJECTIVE:**

Upon completion of the course the students will be able to,

1. To gain knowledge in designing algorithms to solve problems.
2. To understand the concept of linear and nonlinear data structures.
3. To know the concept of various sorting and searching techniques.
4. To acquire knowledge in graph traversal and searching.
5. To apprehend the greedy approach to solve problems.

COURSE OUTCOME:

Upon completion of the course the students will be able to,

1. Compute and Analyze algorithms for efficiency using asymptotic notations.
2. Develop knowledge about basic data structures like arrays, linked list, trees.
3. Solve problems by applying suitable data structure.
4. Define graph and illustrate graph traversal.
5. Design and develop projects requiring implementation of the data structure.

Unit	Content
Unit 1: - Introduction	Introduction to Data structures - Algorithms - Algorithm Specifications - Performance analysis - Space Complexity - Time Complexity - Asymptotic Notations - Elementary of Data structures - Stack and Queue - Linked lists - Singly Linked List - Doubly linked list - Linked list-based implementation of Stacks (9 Hours)
Unit 2: - Trees And Graphs	Trees - Dictionaries - Binary search trees- Priority Queues - Heaps - Heap Sort – Sets and Disjoint Set union - Union and Find operations - Graphs - introduction - definitions – Graph representations. (9 Hours)
Unit 3: - Sorting And Searching	Sorting Algorithms: Basic concepts - Binary search - Finding the maximum and minimum - Merge sort - Quick sort - Performance measure - Randomized sorting algorithms - Selection sort - Strassen's matrix multiplication. (9 Hours)
Unit 4: - Algorithm Basics	Fundamentals of Algorithmic Problem Solving - Sorting - Searching - Graphs - Analysis Framework- Asymptotic Notations and Basic Efficiency Classes Analysis of Recursive and Non-recursive algorithms. Brute Force - Travelling Salesman Problem, Knapsack Problem, Assignment Problem. Divide and Conquer Approach - Binary Tree Traversals, Multiplication of large Integers, Strassen's Matrix Multiplication. (9 Hours)
Unit 5: - Dynamic Programming	Dynamic Programming - Warshall's and Floyd's algorithm - Optimal Binary Search Trees- Memory Functions. Representing Graphs - Breadth First Search (BFS) - Depth First Search (DFS) - Single source shortest path - Dijkstra's algorithm - Prim's algorithm - Kruskal's algorithm - Backtracking - n Queen's problem - Hamiltonian Circuit Problem - Subset-Sum Problem - Branch and Bound - Approximation Algorithms -Travelling Salesman Problem, Knapsack Problem. (9 Hours)

TEXT BOOKS: -

1. Anita Goel, "Computer Fundamentals", 2nd Edition, Pearson Education, 2012.
2. Anany Levitin, "Introduction to the Design and Analysis of Algorithms", Third Edition, Pearson Education, 2017

REFERENCE BOOKS:-

- 1) 1 Norton Peter, "Introduction to Computers", 4th Edition, TMH, 2001.
- 2) 2 P. K. Sinha and Priti Sinha, "Computer Fundamentals", 6th Edition, BPB Publications, 2004.
- 3) 3 Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein, "Introduction to Algorithms", Third Edition, PHI Learning Private Limited, 2012.

COURSE TITLE: OBJECT ORIENTED PROGRAMMING THROUGH JAVA**COURSE OBJECTIVE:**

1. This subject will help to improve the analytical skills of object-oriented programming
2. Overall development of problem solving and critical analysis
3. Formal introduction to Java programming language

COURSE OUTCOME:

On successful completion of this course, the student should be able to:

1. Show competence in the use of the Java programming language in the development of small to medium-sized application programs that demonstrate professionally acceptable coding and performance standard
2. Understand the basic principles of the object-oriented programming
3. Demonstrate an introductory understanding of graphical user interfaces, multithreaded programming, and event-driven programming.

Unit	Content
Unit I: Introduction to Java	Basics of Java programming, Data types, Variables, Operators, Control structures including selection, Looping, Java methods, Overloading, Math class, Arrays in java. (9 Hours)
Unit II: Objects and Classes	Basics of objects and classes in java, Constructors, Finalizer, Visibility modifiers, Methods and objects, Inbuilt classes like String, Character, String Buffer, File, this reference. (9 Hours)
Unit III: Inheritance and Polymorphism	Inheritance in java, Super and sub class, Overriding, Object class, Polymorphism, Dynamic binding, Generic programming, Casting objects, Instance of operator, Abstract class, Interface in java, Package in java, UTIL package. (9 Hours)
Unit IV: Event and GUI programming	Event handling in java, Event types, Mouse and key events, GUI Basics, Panels, Frames, Layout Managers: Flow Layout, Border Layout, Grid Layout, GUI components like Buttons, Check Boxes, Radio Buttons, Labels, Text Fields, Text Areas, Combo Boxes, Lists, Scroll Bars, Sliders, Windows, Menus, Dialog Box, Applet and its life cycle, Introduction to swing. (9 Hours)
Unit V: I/O programming and Multithreading	Text and Binary I/O, Binary I/O classes, Object I/O, Random Access Files. Thread life cycle and methods, Runnable interface, Thread synchronization, Exception handling with try-catch-finally, Collections in java, Introduction to JavaBeans and Network Programming. (9 Hours)

REFERENCE BOOKS:

- 1 Junaid Khateel & Dr. G. T.Thampi Computer Programming in JAVA DreamTech Press
- 2 Sharnam Shah & Vaishali Shah Core JAVA for Beginners SPD
- 3 E Balagurusamy Programming in JAVA a primer TMH
- 4 Sachin Malhotra & Saurabh Chaudhary Programming in JAVA Oxford University Press
- 5 Rashmi Kanta Das Core Java for beginners Vikas Publishing House Pvt. Ltd

NOTE:

- Based on 2CS3
- The list suggests the program set. Hence, the concerned staff may modify the list as needed (minimum 13).

LIST OF PROGRAMS:

- 1) To study Basic SQL commands (create table, use, drop, insert) and execute the following queries using these commands:
 - Create a table 'Emp' with attributes 'ename', 'ecity', 'salary', 'enumber', 'eaddress', 'depttname'.
 - Create another table 'Company' with attributes 'cname', 'ccity', 'empnumber' in the database 'Employee'.
- 2) To study the viewing commands (select, update) and execute the following queries using these commands:
 - Find the names of all employees who live in Delhi.
 - Increase the salary of all employees by Rs. 5,000.
 - Find the company names where the number of employees is greater than 10,000.
 - Change the Company City to Gurgaon where the Company name is 'TCS'.
- 3) To study the commands to modify the structure of table (alter, delete) and execute the following queries using these commands:
 - Add an attribute named 'Designation' to the table 'Emp'.
 - Modify the table 'Emp', Change the datatype of 'salary' attribute to float.
 - Drop the attribute 'depttname' from the table 'emp'.
 - Delete the entries from the table 'Company' where the number of employees are less than 500.
- 4) To study the commands that involve compound conditions (and, or, in, not in, between, not between, like, not like) and execute the following queries using these commands:
 - Find the names of all employees who live in 'Gurgaon' and whose salary is between Rs.20,000 and Rs. 30,000.
 - Find the names of all employees whose names begin with either letter 'A' or 'B'.
 - Find the company names where the company city is 'Delhi' and the number of employees is not between 5000 and 10,000.
 - Find the names of all companies that do not end with letter 'A'.
- 5) To study the aggregate functions (sum, count, max, min, average) and execute the following queries using these commands:
 - Find the sum and average of salaries of all employees in computer science department.
 - Find the number of all employees who live in Delhi.
 - Find the maximum and the minimum salary in the HR department.
- 6) To study the grouping commands (group by, order by) and execute the following queries using these commands:
 - List all employee names in descending order.
 - Find number of employees in each department where number of employees is greater than 5.
 - List all the department names where average salary of a department is Rs.10,000.
- 7) To study the commands involving data constraints and execute the following queries using these commands:
 - Alter table 'Emp' and make 'enumber' as the primary key.
 - Alter table 'Company' and add the foreign key constraint.
 - Add a check constraint in the table 'Emp' such that salary has the value between 0 and Rs.1,00,000
 - Alter table 'Company' and add unique constraint to column cname
 - Add a default constraint to column ccity of table company with the value 'Delhi'

- 8) To study the commands for joins (cross join, inner join, outer join) and execute the following queries using these commands:
- Retrieve the complete record of an employee and its company from both the table using joins.
 - List all the employees working in the company 'TCS'.
- 9) To study the various set operations and execute the following queries using these commands:
- List the number of all employees who live in Delhi and whose company is in Gurgaon or if both conditions are true.
 - List the number of all employees who live in Delhi but whose company is not in Gurgaon.
- 10) To study the various scalar functions and string functions (power, square, substring, reverse, upper, lower, concatenation) and execute the following queries using these commands:
- Reverse the names of all employees.
 - Change the names of company cities to uppercase.
 - Concatenate name and city of the employee.
- 11) To study the commands involving indexes and execute the following queries:
- Create an index with attribute ename on the table employee.
 - Create a composite index with attributes cname and ccity on table company.
 - Drop all indexes created on table company.
- 12) To study the conditional controls and case statement in PL-SQL and execute the following queries:
- Calculate the average salary from table 'Emp' and print increase the salary if the average salary is less than 10,000.
 - Display the deptno from the employee table using the case statement if the deptname is 'Technical' then deptno is 1, if the deptname is 'HR' then the deptno is 2 else deptno is 3.
- 13) To study procedures and triggers in PL-SQL and execute the following queries:
- Create a procedure on table employee to display the details of employee to display the details of employees by providing them value of salaries during execution.
 - Create a trigger on table company for deletion where the whole table is displayed when delete operation is performed.
- 14) Consider the tables given below. The primary keys are made bold and the data types are specified.
- PERSON (**driver_id**:string , name:string , address:string)
- CAR (**regno**:string , model:string , year:int)
- ACCIDENT (**report_number**:int, **accd_date**:date , location:string)
- OWNS (**driver_id**:string , **regno**:string)
- PARTICIPATED (**driver_id**:string , **regno**:string , **report_number**:int , **damage_amount**:int)
- Create the above tables by properly specifying the primary keys and foreign keys.
 - Enter at least five tuples for each relation.
Demonstrate how you
 - Update the damage amount for the car with specific regno in the accident with report number 12 to 25000.
 - Find the total number of people who owned cars that were involved in accidents in the year 2008.
 - Find the number of accidents in which cars belonging to a specific model were involved.

COURSE TITLE: DATA STRUCTURE – LAB**NOTE:**

- Based on 2CS4
- The list suggests the program set. Hence, the concerned staff may modify the list as needed (minimum 13).

LIST OF PRACTICALS:

1. Implementing basic operations on arrays: insertion, deletion, searching.
2. Implementing linked lists: singly linked list, doubly linked list.
3. Implementing stack and queue using arrays and linked lists.
4. Implementing tree traversal algorithms: preorder, in order, post order.
5. Implementing binary search trees (BST) and operations: insertion, deletion, searching.
6. Implementing sorting algorithms: selection sort, bubble sort, insertion sort.
7. Implementing searching algorithms: linear search, binary search.
8. Implementing graph representation: adjacency matrix, adjacency list.
9. Implementing graph traversal algorithms: depth-first search (DFS), breadth-first search (BFS).
10. Implementing shortest path algorithms: Dijkstra's algorithm, Bellman-Ford algorithm.

COURSE TITLE: JAVA PROGRAMMING – LAB**NOTE:**

- Based on 2CS5
- The list suggests the program set. Hence, the concerned staff may modify the list as needed (minimum 13).

LIST OF PRACTICAL:

- 1 Program to define a structure of a basic JAVA program
- 2 Program to define the data types, variable, operators, arrays and control structures.
- 3 Program to define class and constructors. Demonstrate constructors.
- 4 Program to define class, methods and objects. Demonstrate method overloading.
- 5 Program to define inheritance and show method overriding.
- 6 Program to demonstrate Exception Handling.
- 7 Program to demonstrate Multithreading.
- 8 Program to demonstrate I/O operations.
- 9 Program to demonstrate Network Programming.
- 10 Program to demonstrate Applet structure and event handling
- 11 Program to demonstrate Layout managers.

COURSE TITLE: ENVIRONMENTAL ETHICS COURSE**OBJECTIVE:**

1. Understand the philosophical foundations of environmental ethics.
2. Analyze ethical theories and principles as they apply to environmental issues.
3. Evaluate the ethical dimensions of human impacts on the environment.
4. Explore the role of values, attitudes, and cultural perspectives in shaping environmental ethics
5. Develop critical thinking and decision-making skills for addressing environmental challenges.

COURSE OUTCOME:

1. Identify and describe key concepts and theories in environmental ethics.
2. Critically analyze ethical arguments and perspectives on environmental issues.
3. Apply ethical principles and frameworks to evaluate human interactions with the environment.
4. Demonstrate awareness of the interconnectedness of environmental, social, and economic systems.
5. Engage in informed dialogue and ethical decision-making regarding environmental problems and solutions.

Unit	Content
Unit 1: Foundations of Environmental Ethics	Introduction to Environmental Ethics, Philosophical Perspectives: Anthropocentrism, Biocentrism, Ecocentrism Ethical Theories: Utilitarianism, Deontology, Virtue Ethics, Environmental Justice and Equity (6 Hours)
Unit 2: Human Impacts on the Environment	Environmental Degradation: Pollution, Deforestation, Habitat Loss, Climate Change: Causes, Impacts, Mitigation Strategies, Biodiversity Conservation and Preservation, Sustainable Development and Resource Management (6 Hours)
Unit 3: Ethics of Environmental Policy and Governance	Environmental Policy and Regulation, Environmental Economics: Cost-Benefit Analysis, Externalities, Environmental Law and Legal Rights for Nature, Corporate Social Responsibility (6 Hours)
Unit 4: Cultural Perspectives and Indigenous Knowledge	Indigenous Environmental Ethics and Traditional Ecological Knowledge (TEK), Cultural Values and Environmental Attitudes, Environmental Ethics in Religious and Spiritual Traditions, Environmental Education and Awareness (6 Hours)
Unit 5: Ethical Decision-Making and Action	Ethical Leadership and Advocacy, Citizen Engagement and Environmental Activism, Ethics of Sustainability: Individual and Collective Responsibilities, Case Studies and Ethical Dilemmas in Environmental Ethics (6 Hours)

REFERENCE BOOKS:

"Environmental Ethics: An Introduction" by Joseph R. DesJardins.

"Environmental Ethics: Readings in Theory and Application" by Louis P. Pojman and Paul Pojman