YEAR-WISE AND SEMESTER-WISE DISTRIBUTION OF SUBJECTS
DEPARTMENT OF COMPUTER SCIENCE
B.Sc. (COMPUTER SCIENCE AND INFORMATION TECHNOLOGY)
THIRD SEMESTER
ACADEMIC YEAR 2024-25 OF 2023-26 BATCH (CBCS)

Sl. No.	Part	Subject Code	Title of the Subject	Hours /Week	Duration of Exam (hrs.)	Marks			Credits
						Internal	External	Total	
1	I	ES23301	Environmental Studies and Gender Sensitization (AECC-5)	3	3	40	60	100	3
2	II	G20CSIT 1T	PC Hardware, and Software Installation (GE-2) (ID)	2	3	40	60	100	2
3	II	CSIT23301	Principles of Information security (SEC-2)	4	3	40	60	100	4
4	II	BS18335	Discrete Mathematics (Core-7)	5	3	40	60	100	4
5	II	CSIT23302	Computer Networks (Core-8)	4	3	40	60	100	4
6	II	BS18336	Java Programming (Core-9)	4	3	40	60	100	4
	PRACTICALS								
7	II	G20CSIT1P	PC Hardware and Software Installation – Lab (GE-2) (ID)	2	3	40	60	100	1
8	II	CSIT23303	Principles of Information security-Lab (SEC-2)	2	3	40	60	100	1
9	II	CSIT23304	Computer Networks-Lab (Core-8)	2	3	40	60	100	1
10	II	BS18337	Java Programming - Lab (Core-9)	2	3	40	60	100	1
11	II	CSIT18305	Internship*	-	-	40	-	40	
Total				**30**	**-**	440	600	1040	**25**

***Generic Elective (GE)** ***Ability Enhancement Compulsory Course (AECC)**
***Skill Enhanced Compulsory Course (SECC)** ***Inter-disciplinary (ID)**

LIST OF GE COURSES OFFERED IN AY 2024 - 25

S. No	Name of the Department	GE Course
1	B.Sc. Chemical Technology	Solar Processing Technologies
2	B.Sc. Agricultural Science and Rural Development	Principles of Organic farming
3	B.Sc. Computer Science and Engineering	PC Operating Systems
4	B. Com Honors	Taxation
5	B.Sc. Computer Science and Information Technology	PC Hardware and Software Installation
6	B. Com Marketing	Principles of Marketing
7	B.Sc. Biotechnology, Genetics and Chemistry	Medical Lab Technology
8	B. Com Business Studies	Banking
9	B.A Mass Communication	Photography
		Film Appreciation
10	B.Sc. Food Technology and Management	Food Processing and Quality Control
11	B A Psychology, English Literature & Journalism	Communication Skills
		Career Skills
		Psychology for Living
12	B.Sc. Mathematics, Statistics & Computer Science	Quantitative Aptitude
		Statistics-Data Analysis
13	B.Sc. Multimedia and Animation	Creative Arts
14	B. Com Computer Applications	Accounting
15	BBA	Principles of Management
16	B. Com International Finance	Project Management
17	B.Sc. Computer Data Science & Data Analytics Engg.	Python programming
18	B. Com Honors Strategic Finance	Goods and Services Tax
19	B. Com Business Process Management	Financial Markets
20	B.Sc. Food Science, Nutrition and Dietetics	Nutrition and Dietetics
21	B.Sc. Computer Science & Cognitive Systems	Introduction to Worksheets
22	B. Com Business Analytics	Principles of Insurance
23	B.Sc. Computer Science and Artificial Intelligence	LISP Programming
24	B.Sc. Computer Science and Cyber Security	Principles of Information Security
25	B.A Economics, Public Administration and Computer Applications	Human Rights

26	B.Sc. Computer Science and Cloud Computing	Web Programming
27	B.Sc. Computer Science and Internet of Things	Introduction to IoT using Arudino
28	B.Com Information Systems	Human Resource Management
29	B.B.A Entrepreneurship Development	Start-up Management
30	B.B.A Retail Operations Management	Consumer Behavior

ENVIRONMENTAL STUDIES & GENDER SENSITIZATION

Credits: 3 **Semester: III**
Course Code: ES23301 No. of Lecture Hours: 45

Objectives:
- To understand the importance of ecological balance for Sustainable Development
- To understand the impacts of developmental activities and mitigation measures
- To understand the environmental policies and regulations.
- To develop students' sensibility with regard to issues of gender in contemporary India
- To provide a perspective on the socialization of men and women
- To expose the students to debate on the politics and economic works and on gender violence

Course Outcomes:
CO1: **Understand** the importance of Environmental education, conservation of natural resources & understand the importance of ecosystems and biodiversity.
CO2: Understand the pollution problems and apply the environmental science knowledge on solid waste management, disaster management.
CO3: **Apply** the environmental science knowledge to improve the resources and Evaluate and understand the sustainable environmental conditions and control methods.
CO4: **Identify** the interactions and intersections of identities (e.g., gender, race, ethnicity, class, sexuality, and so on) and assess the ways in which they contribute to instances of privilege and power dynamics across cultures, space, and time and their problems.
CO5: **Understand** the gender problems and ways of addressing them, including interactions across local to global scales in communities and overcome inequalities with legislations

UNIT- I **9Hrs**
NATURAL RESOURCES, ECOSYSTEMS & BIODIVERSITY
- Definition, Scope and importance of environmental studies. Need for public awareness.
- Renewable & Non-Renewable resources, Brief account on Forests, Water, Minerals and Energy (Solar, Wind, and Geo-thermal & Bio-energy).
- Definition of Ecosystem, Structure and functions—food chains, food webs, ecological pyramids, producers, consumers and decomposers.
- Energy flow and example ecosystems--- Forest, Desert, Aquatic ecosystems.
- Definition of Biodiversity, types (Genetic, Species, Ecosystem), India- mega diversity Nation.
- Hotspots, Threats to biodiversity, Conservation of biodiversity (In-Situ and Ex-Situ).

UNIT-II **9Hrs**

ENVIRONMENTAL POLLUTION

- Definition of Environmental pollution
- Brief account of causes, effects, prevention and control measures of
  - (a) Air pollution
  - (b) Water Pollution
  - (c) Soil pollution
  - (d) Noise pollution
  - (e) Marine Pollution
- Solid Waste Management: Causes, Effects & Control measures of urban and industrial wastes
- Disaster Management: floods, Earth quakes, and Cyclones.

UNIT-III **9Hrs**

Social Issues and Environment

- Rain-Water Harvesting, Water-shed Management, and From Unsustainable to Sustainable Development.
- Global Warming, Ozone depletion, and Acid rains
- Environmental Legislation: Air Act, Water Act, Environmental Protection Act, Forest Act, Wildlife Act.
- Environmental & Human Health---- HIV/AIDS
- Welfare Programs---- Family, Women & Child Welfare, Population Explosion
- Role of Information Technology in Environmental Studies.

UNIT-IV **9Hrs**

Gender Studies

- Why should we study gender issues?
- Socialization- Making women and making men
- Being together as equals-Through the lens of gender
- Missing women: Gender selection and its consequences
- Health issues of Women

UNIT-V **9Hrs**

Gender & Labour -Gender Violence & Law

- House work: The invisible labour- my mother doesn't work "share the load"
- Sexual harassment – say no eve teasing – the caste-based violence –Nirbhaya Act
- Domestic violence - Is home a safe place? - Blaming the victim. -Domestic violence Act
- Forums of justice-Hindu Inheritance Act (2005)

Field Visit for Environmental Studies:

1. Visit to a local Polluted site- Industrial effluent plant/ Polluted Lake/Agricultural Land
2. Visit to any Ecosystem

ESSENTIAL READING (for Gender Sensitization)

1. A. Suneetha, Uma Bhrugubanda, Duggirala Vasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu. 201. **Towards a World of Equals: A Bilingual Text on Gender**. Hyderabad: Telugu Akademi.

SUGGESTED READING

(for Environmental Studies)

1. Rajagopalan R. 2015. **Environmental Studies-from Crisis to Cure.** Third Edition. Chennai: Oxford University Press.
2. Dr D K Asthana and Dr Meera Asthana. 2014. **A Text Book of Environmental Studies** Revised Edition. New Delhi: S. Chand & Company.
3. Anubha Kaushik and C.P. Kaushik Published. 2016. **Perspectives in Environmental Studies.** Fifth Edition. New Delhi: New Age International.

(for Gender Sensitization)

4. Sen Amartya More **Than One Million Women Are Missing.** New York Review of Books 37.20 (20 December 1990). Print. **We Were Making History...Life Stories of Women in the Telangana People's Struggle**. New Delhi: Kali for Women. 1998.
5. Tripti Lahiri. **By the Numbers: Where Indian Women Work. Women's Studies Journal .** (14 November 2012). Available online at: <http://blogs.wsj.com/ India real time/2012/11/14/by – the numbers-where-Indian-women-work/>
6. K. Satyanarayana and Susie Tharu. Ed. **Steel Nibs Are Sprouting : New Dalit Writing From South India, Dossier 2: Telugu and Kanada** Code=3732.
7. Vimala. **Vantillu (The Kitchen)". Women Writing in India: 600 Bc to the Present. Volume II.** The 20th Century. Ed. Suise Tharu and K.Laltitha. Delhi: Oxford University Press, 1995.599-601.
8. Shatrughna, Veena. **Women's Work and its Impact on Child Health and Nutrition.** Hyderabad: National Institute of Nutrition, Indian Council of Medical Research .1993.

PC HARDWARE AND SOFTWARE INSTALLATION
(GE Inter-disciplinary)
(NEW SYLLABUS)

Credits : 2 **Semester: III**
Course Code : G20CSIT 1T **No. of Lecture Hours: 30**

Objectives:
- To learn the fundamentals of personal computing and basic networking concepts.
- To learn basics of hardware, operating systems, and application software.

Course Outcome:
CO1: Identify the basic components of computers
CO2: Differentiate between internal and external connectors
CO3: Identify and troubleshoot the power supply of computer
CO4: Choose RAM and Hard disk drives for a computer
CO5: Develop skill to Assembly and Disassembly a system

UNIT –I	**6Hrs**
1. Introduction to Computers, History, classification, Block diagram of Computer	2
2. Hardware and Software, Input and Output Devices	1
3. Data and information and Computer memory Units	1
4. Computer Ports and Characteristics of Ports.	2

UNIT -II	**6Hrs**
1. System Unit: Motherboard Form Factor (ATX, BTX)	1
2. **Internal Connectors**: Power Supply Connectors, PCI, ISA, IDE, AGP, PCI Express, SATA, DIMM.	1
3. **External Connectors**: Serial Port, Parallel Port, Game Port, USB, RJ-45, VGA or Monitor, PS/2, Din, Sound Card	1
4. Motherboard ROM BIOS, Upgrading BIOS	3

UNIT-III	**6Hrs**
1. Chipsets: Northbridge and Southbridge.	1
2. Power Supply: Introduction of SMPS	2
3. troubleshooting of SMPS	1
4. Memory: RAM and ROM; Types of RAM: DRAM, SDRAM, DDR, DDR2 and DDR3	2

UNIT-IV	**6Hrs**
1. Storage Devices: HDD vs SDD	1
2. Types of hard disk drives and its controllers: IDE, SATA, USB, SCSI	1
3. Working of Hard Disk Drive and file systems	2
4. recovery of Data from storage device	2
UNIT-V	**6Hrs**
1. System Assembly and Disassembly	2
2. System startup, installing OS, Troubleshooting New installations	2
3. PC Diagnostics-The POST, Hardware BOOT Process	2

ESSENTIAL READING

1. Mueller Scott, M. 2015. **Upgrading and Repairing PCs**. 22nd Edition. New Delhi : Pearson Education

PRINCIPLES OF INFORMATION SECURITY

Credits:4 **Semester: III**
Course Code: CSIT23301 **No. of Lecture hours:60**

Objectives:

- To compile, analyse, and assess the applicability of best practices in addressing information
- To address the issues relevant to the cyber security community

Course Outcomes:

CO1: **Explain** concepts of confidentiality, availability and integrity (CIA) in context of Information security
CO2: **Identify** the risk, assess and risk control strategies.
CO3: **Demonstrate** expertise in configuring host and network level technical security controls to include host firewalls, user access controls, host logging, network filtering, intrusion detection and prevention
CO4: **Analyse** systems, tools, methods, and techniques for securing digital information within an organisation
CO5: **Develop** encryption and decryption techniques.

UNIT –I **12Hrs**
INTRODUCTION OF INFORMATION SECURITY

1.	Introduction to Security, Critical Characteristics of Information	2
2.	NSTISSC Security Model, Components of Information Security, Balancing Information Security and Access	2
3.	Approaches to Information Security Implementation, System Development Life Cycle	2
4.	Security System Development Life Cycle, Information Security :Art of Science	3

UNIT –II **12 Hrs**
THE NEED FOR SECURITY

1.	Important functions of Information Security	2
2.	Threats and category of Threats	4
3.	Attacks and Types of Attacks	4
4.	Secure Software development	2

UNIT –III **12 Hrs**
SECURITY TECHNOLOGY: FIREWALLS AND VPNS

1.	Firewalls: Processing modes, categorizations	2
2.	Firewall Architecture, Choosing a Firewall	2
3.	Configuring and Managing a Firewall	2

4.	Firewall Rules	2
5.	Protecting Remote Connections: Securing Authentication with Kerberos	2
6.	VPN: Transport and Tunnel Mode	2

UNIT-IV **12 Hrs**

SECURITY TECHNOLOGIES: INTRUSION DETECTION AND OTHER SECURITY TOOLS

1.	IDPS: terminology, types of IDPS	3
2.	IDPS Detection Methods, IDPS Response Behaviour	2
3.	Strengths and Limitations of IDPS	1
4.	Honeypots, Honeynets and Padded Cell Systems	1
5.	Port Scanners, Firewall Analysis Tools	1
6.	Operating System Detection Tools, Vulnerability Scanners	2
7.	Packet Sniffers, Wireless Security Tools	2

UNIT-V **12 Hrs**

CRYPTOGRAPHY

1.	Terminology, Cryptographic Tools, PKI,	2
2.	Digital Signature, Digital Certificate and Steganography	1
3.	Protocol for Secure Communication: Securing Internet with SSL	1
4.	Securing Email with S/MIME,PGP	2
5.	Securing web Transactions SET	2
6.	Securing wireless Network with WEP and WPA	2
7.	Securing TCP/IP with IPSEC	2

ESSENTIAL READING

1. Whitman Michael, E. and Mattord Herbert, J. 2011. **Principles of Information Security**. 4th Edition. USA: Course Technology.

DISCRETE MATHEMATICS

Credits : 4 **Semester: III**
Course Code : BS18335 **No. of Lecture Hours: 75**

Objective: To introduce lattices, Graph theory and to familiarize with the basic concepts of Number theory.

Course Outcomes:
CO1: Develop understanding of Logic Sets and Functions
CO2: **Evaluate** and apply the fundamental concepts in graph theory
CO3: **Develop** an understanding of how graph and tree concepts are used to solve problems arising in the computer science.
CO4: Express the concepts and results of Number Theory.
CO5: **Identify** methods and techniques used in number theory.

UNIT- I **15Hrs**
LATTICES

1. Relations and ordering 3
2. Partial order relations - Partially ordered sets 3
3. Hasse diagrams 3
4. Lattices - Properties of lattices 3
5. Types of Lattices 3

UNIT II **15Hrs**
GRAPH THEORY – I

1. Definition of a graph, Degree of vertex 3
2. First theorem of graph theory Paths and connection 3
3. Isomorphism of graphs 3
4. Some special simple graphs 6

UNIT III **15Hrs**
GRAPH THEORY – II

1. Trees and their properties 9
2. Binary trees, Binary search trees, Spanning trees, Kruskal's Algorithm, Prim's Algorithm, Planar graphs, Euler's formula 6

UNIT IV **15Hrs**
GRAPH THEORY-III

1. Euler graphs 5
2. Hamiltonian graphs- Grinberg theorem 5
3. Chromatic numbers 5

UNIT-V **15Hrs**

ELEMENTS OF NUMBER THEORY

1. Divisibility- Division algorithm 1
2. Euclid' algorithm 2
3. Properties of G.C.D 2
4. Primes – Fundamental theorem of Arithmetic. 2
5. Congruence's – Properties 2
6. Fermat's theorem and its Applications 3
7. Wilson's theorem and its Applications 3

ESSENTIAL READING

1. Tremblay Jean, P. and Manohar, R. 2007. **Discrete Mathematical Structures with Applications to Computer Science.** New Delhi: McGraw-Hill. (For Unit I)
2. Mott Joe, L. Kandel Abraham. And Baker Theodore, P. 1999. **Discrete Mathematics for Computer Scientists and Mathematicians.** 2nd Edition. New Delhi: PHI (For Units II,III and IV)
3. Burton David, M. 2010. **Elementary Number Theory**. 7th Edition. New Delhi: McGraw-Hill. (For Unit V)

COMPUTER NETWORKS

Credits: 4 **Semester: III**

Subject Code: CSIT23302 **No. of Lecture Hours: 60**

Objectives:

- To get familiarised with fundamental concepts of computer networks.
- To gain expertise in various layers of the TCP/IP model.

Course Outcomes:

CO1: **Identify** basic computer network topologies and protocols and explain Data Communication System components
CO2: **Classify** different error detecting techniques.
CO3: C**onstruct** subnetting and routing mechanisms.
CO4: **Sketch** the routing protocols and analyse how to assign the IP addresses for the given network
CO5: **Develop** network design and implementation

UNIT-I **12Hrs**

1. Introduction: Data Communications, networks, Protocols and Standards 2
2. TCP/IP Protocol suite 2
3. Analog and Digital, Transmission impairments 2
4. Transmission Media-Guided media, Connecting Devices 1
5. Digital Transmission- digital-to-digital conversion 2
6. Multiplexing: Frequency-division, Wavelength and Time Division 3

UNIT-II **12Hrs**

DATA LINK LAYER

1. Error detection and correction-Parity, check sum, CRC, Hamming code 3
2. Data Link Control: Framing, flow and error control 3
3. Stop-and-wait ARQ, Go-Back-N ARQ, Selective Repeat ARQ, Piggybacking 3
4. HDLC, Random Access- ALOHA, CSMA, CSMA/CD, CSMA/CA 2
5. Wired LANs- Ethernet 1

UNIT-III **12Hrs**

NETWORK LAYER

1. IP address space- Introduction 3
2. Classful and Classless addressing, subnetting and supernetting 2
3. IPv4- datagram, Fragmentation, checksum, options 2
4. Internet Control Protocols- ICMP, IGMP, ARP and RARP 3
5. Delivery, Forwarding, Unicast routing protocols- RIP, OSPF, BGP 2

UNIT-IV **12Hrs**

TRANSPORT LAYER

1. Process-to-Process Delivery, UDP-well known ports, user datagram, checksum 2

2. UDP Operation, use of UDP 3
3. TCP- process to process communication, Numbering bytes, TCP services 3
4. Flow control- silly window syndrome, Error Control 2
5. TCP connection, State transition diagram, Congestion control, Timers, Options 2

UNIT-V **12Hrs**

APPLICATION LAYER

1. DNS- Namespace, domain name space, distribution of name space 2
2. DNS in internet, resolution, DNS messages, types of records 3
3. TELNET, E-mail- architecture, message transfer agent: SMTP 3
4. Message Access Agent: POP, FTP 2
5. WWW and HTTP- architecture, web documents, HTTP 2

ESSENTIAL READING

1. Forouzan, Beharouz A. 2011. **Data Communications and Networking**. 3rd Edition. New Delhi: Tata Mc Graw Hill.(UNIT-I,II)
2. Forouzan, Beharouz A. 2005. **TCP/IP Protocol Suite**. 3rd Edition. New Delhi: Tata Mc Graw Hill.(UNIT-III-V)

SUGGESTED READING

1. Tanenbaum, Andrew S. 2008. **Computer Networks**. 4th Edition. New Delhi: Pearson Education.

JAVA PROGRAMMING

Credits : 4 **Semester: III**
Course Code : BS18336 **No. of Lecture Hours: 60**

Objectives:

- To help the students understand the fundamentals of object-oriented programming.
- To emphasize on learning important principles of software development and provide practice in developing small-scale programs.

Course Outcomes:

CO1: **Differentiate** between object-oriented programming and procedure-oriented programming
CO2: **Apply** object-oriented programming features for solving a given problem.
CO3: **Select** an appropriate exception handling depending on application.
CO4: **Design** file operations using java standard library
CO5: **Develop** interactive programs using applet and swing

UNIT – I	**12Hrs**
1. **Object-Oriented Programming:** Introduction, Object Oriented Paradigm	1
2. Basic concepts	1
3. Benefits of OOP, Applications of OOP	1
4. Introduction to Java, , Features of Java,	1
5. Simple Java Program, Java Program Structure	1
6. Java Tokens, Java Statements, JVM	1
7. Variables, Data types, Operators and Control statements	1
8. Java Program structure, Simple Java program	1
9. **Classes, Objects and Methods:** Defining Class, Adding Variables, Methods	2
10. Creating Objects, Accessing Class Members	1
11. Constructors, finalize() method	1

UNIT – II	**12Hrs**
1. Method Overloading, Static Members, Nesting of Method	1
2. Inheritance, Overriding Methods, Final Variables and Methods, Final Classes	2
3. Abstract Methods and Classes ,Visibility Control	1
4. Arrays, Strings and Vectors, Wrapper classes	1
5. **Interfaces:** Defining Interfaces , Extending and Implementing Interfaces	2
6. Accessing Interface variables	1
7. **Packages:** Java API Packages, Using system Packages	1
8. Naming Conventions, Creating Packages	1
9. Accessing a Package , Using a Package, Adding a Class to a Package	2

UNIT – III **12Hrs**

1. **Exception Handling:** Types of Errors, Exceptions 1
2. Uncaught Exceptions, Using try and catch 1
3. Multiple Catch Statements, Nested try statements , throw, throws and finally 2
4. Java's Built in Exceptions, User Defined Exceptions 1
5. **Multithreaded Programming:** Creating Threads, Extending the Thread Class, Stopping and Blocking a Thread 3
6. Life Cycle of a Thread 1
7. Using Thread Methods , Thread Exceptions, Thread Priority, Synchronization 3

UNIT – IV **12Hrs**

1. **Input/output Files**: Introduction, Concept of Streams, Stream Classes, Byte Stream Classes 2
2. Character Stream Classes, Using the File Class, Input-Output Exception 2
3. Creation of Files, Bytes, Handling Primitive Data Types 2
4. Random Access Files, Simple Input/Output 2
5. **Applets:** Applet Class, Basics, Applet vs Application ,Life Cycle 2
6. Applet Tag, Passing Parameters, A Simple Banner Applet 2

UNIT –V **12Hrs**

1. **Event and Event Handling:** Sources of Events 1
2. **Event Classes:** Action Event, Mouse Event, Window Event, Item Event, Key Event 2
3. Event Listeners,-Action listener, Mouse Listener, Mouse Motion Window Listener, Key Listener, Handling Events. 3
4. **Swing Controls:** Label and ImageIcon, JButton,JRadioButton, JCheckbox, JTable, JList, JToggleButton, 3
5. JTree, JCombobox, JTextField, JOptionPane 3

ESSENTIAL READING

1. Schildt Herbert. 2002. **Java 2: The Complete Reference.** 5th Edition. New Delhi: McGraw-Hill.

SUGGESTED READING

1. Deitel Paul, J and Deitel Harvey, M. 2012. **Java: How to Program**. 6th Edition. New Delhi: PHI.
2. Gaddis Tony. 2015. **Starting Out With Java**. 6th Edition. New Delhi: Pearson

PC HARDWARE AND SOFTWARE INSTALLATION LAB
(GE Inter-disciplinary)
(NEW SYLLABUS)

Credits : 1 **Semester: III**
Course Code : G20CSIT1P **No. of Practical Hours: 30**

Objectives:

- To identify various components of PC.
- To learn installation of windows and Linux operating system.
- To learn the installation and configuration of networking

Outcome: Students will be able to assemble the PC and install operating systems and application software.

No. of Hours	Topics
1.	Processor Types, Expansion Buses, connectors and cables
2.	Identification of Mother Boards, Chipsets, Memory and Types.
3.	Storage Devices: Hard Disk, Optical Storage and USB
4.	Exploring CMOS BIOS Setup utility.
5.	Identify and Assembling of PC.
6.	Installation of Windows 7.0 Operating System.
7.	Installation of Linux Operating System
8.	Recovery of data from storage device
9.	Study of different types of network cables
10.	practically implement the cross-wired cable and straight through cable using clamping tool
11.	study of network Devices in Detail
12.	Study of Network IP
13.	Connect the computer in Local Area Network
14.	Study of basic network command and network configuration commands
15.	Study of latest devices in Market

PRINCIPLES OF INFORMATION SECURITY LAB

Credits : 1 **Semester: III**
Course Code : CSIT23303 **No. of Practical Hours: 30**

Objective: To analyse the security tools for protecting the information.

Outcome: Students will be able to work with computer security tools and simulate network architecture

No of Hours **TOPIC**

1. Installation of Operating System Using VMware.
2. Exploring Internet Options for a Browser, Examination and configuring the Contents of Security and Privacy Tabs Using Nmap
   - Find open ports on a System
   - Find the machines which are active
   - Find the version of Remote OS on other systems
   - Find the version of Software installed on another system.
3. Program to implement Virus.
4. Demonstrate Intrusion Detection System
5. Exploring Wireless Security Tools (Air snare)
6. Implementation of Stenography –Hiding a Text File within a Image File using WinRar
7. Digital Signing a word document, PDF document and Email
8. Creating Public Key, Private Key and Digital Certificate
9. Create SSL Certificate Using XCA Software
10. Demonstration of Hash Function using Cry tool
11. Study of Hardware and Software Firewalls and Case Study on Man-In-Middle Phishing and pharming Attacks

COMPUTER NETWORKS LAB

Credits: 1 **Semester: III**
Course Code: CSIT23304 **No. of Practical Hours: 30**

Objective:

- Hands-On training regarding the design, troubleshooting and evaluation of computer networks

Outcome:

Demonstrate basic switching concepts, VLAN, routing, dynamic and static routing protocols using Cisco packet tracer software (Freeware)

No. of Hrs	Topic
1	Study of different types of Network cables and practically implement cross-wired Cable and straight through cable using crimping tool
2	Study the Network Devices in Detail
3	Study of Network IP
4	Connect the Computers in LAN
5	Study of Basic Networking Commands
6	Configure a Network Topology using Packet Tracer
7	Performing an Initial Switch Configuration
8	Performing an Initial Router Configuration
9	Interpreting Ping and Traceroute Output
10	Observing Static and Dynamic Routing
11	Configure a Network Using Distance Vector Routing Protocol
12	Configure a Network Using Link State Vector Routing Protocol

JAVA PROGRAMMING LAB

Credits : 1 **Semester: III**
Course Code : BS18337 **No. of Practical Hours: 30**
Objectives:

- To strengthen problem solving ability by applying the characteristics of an object-oriented approach in Java.
- To build software for real world applications.
- To implement frontend of an application

Outcome: Students will be able to develop applications using object-oriented concepts of varying complexities.

1. Program to print student details by class concept.
2. Program to add two numbers using method overloading.
3. Program to demonstrate application of constructors.
4. Program to implement single inheritance.
5. Program to implement method overriding.
6. Program to demonstrate abstract class.
7. Program to implement packages.
8. Program to implement interfaces.
9. Program to illustrate interface extending another interface.
10. Program to implement try and catch statements
11. Program to illustrate multiple catch blocks
12. Program to implement nesting of try block.
13. Program to implement finally statement.
14. Program to implement throw in exception handling.
15. Program to implement throw using user defined exception.
16. Program to implement a simple multithreading program.
17. Program to implement runnable interface.
18. Program to implement thread priority.
19. Program to read and write characters.
20. Program to count no. of characters, words and lines in a file.
21. Program to read and write primitive data.
22. Program to implement Random Access files.
23. Program for animation in applet.
24. Program for reading parameter through applet.
25. Develop an Applet to compute factorial value when the button “Compute” is clicked.
26. Develop an Applet to computer Arithmetic operations when the button is clicked.
27. Program handling mouse events and shows the event name at the center of the window when a mouse event is fired. (Use adapter classes).
28. An applet program on (i) JCombobox, (ii) JToggleButton (iii) JList (iv) JTabbedpane
29. An applet program for validating user credentials.

INTERNSHIP

Credits : 3 **Semester: III**
Course Code: CSIT18305 **No. of Hours: 15**

Second year students are required to take up an internship / On Job Training in the domain of Networking, System assembling and disassembling, PC Hardware Installation and Trouble Shooting, or Network Administration during summer for 4 weeks which carries a total of 40 marks evaluated internally.

The criteria for the Internal Evaluation of Internship work / On Job Training Work for 40 marks is as follows:

1.	Attendance	5 marks
2.	Internal Presentation (Presentation and Communication skills)	10 marks
3.	Practical demonstration (Objectives, work submission, methodology, results, Practical relevance evaluated by the faculty)	15 marks
4.	Report	10 marks

YEAR-WISE AND SEMESTER-WISE DISTRIBUTION OF SUBJECTS
DEPARTMENT OF COMPUTER SCIENCE
B.Sc. (COMPUTER SCIENCE & INFORMATION TECHNOLOGY)
FOURTH SEMESTER
ACADEMIC YEAR 2024 - 25 OF 2023-26 BATCH (CBCS)

Sl. No.	Part	Subject Code	Title of the Subject	Hours /Week	Duration of Exam (hrs.)	Marks			Credits
						Internal	External	Total	
1	II	BS23401	Probability and Statistics (GE-3) (DS)	4	3	40	60	100	4
2	II	CSIT23401	Ethical Hacking (SEC-3)	4	3	40	60	100	4
3	II	CSIT20402	Computer Organization (Core-10)	3	3	40	60	100	3
4	II	BS18430	Operating Systems (Core-11)	4	3	40	60	100	4
5	II	BS20404	Micro Processors & Micro Controllers (Core-12)	3	3	40	60	100	3
6	II	CSIT20403	Python Programming (Core-13)	3	3	40	60	100	3
	PRACTICALS								
7	II	CSIT23404	Ethical Hacking-Lab (SEC-3)	2	3	40	60	100	1
8	II	BS18431	Unix Shell Programming -Lab (Core-11)	2	3	40	60	100	1
9	II	CSIT18405	Micro Processors and Applications-Lab (Core-12)	2	3	40	60	100	1
10	II	CSIT20406	Python Programming – Lab (Core-13)	2	3	40	60	100	1
Total				**29**	**-**	400	600	1000	**25**

*** Generic Elective (GE) *Skill Enhancement Course (SEC) *Discipline-Specific (DS)**

PROBABILITY & STATISTICS

Credits:4 **Semester: IV**
Course Code: BS23401 **No. of Lecture Hours: 60**

Objective: To teach concepts and applications of Statistics in real life situations**.**
Outcome:
CO1: Calculate the mean, median, and mode of a set of data and **identify** the importance of measures of dispersion.
CO2: Use discrete and continuous probability distributions, including requirements and making decisions.
CO3: Employee the principles of linear regression and correlation, including least square method, predicting a particular value of Y for a given value of X and significance of the correlation coefficient.
CO4: **Knowledge** about formulating and testing a hypothesis, using critical values to draw conclusions and determining probability of making errors in hypothesis tests, and about large sample tests.
CO5: Understand and **analyze** various methods of small sample tests.

NOTE: APPLICATION ORIENTED ONLY. NO MATHEMATICAL DERIVATIONS.

UNIT – I **12 hrs**

1. Various measures of Central Tendency – Mean, Median & Mode
   Definitions, Merits, Demerit, Problems (grouped and ungrouped data)
2. Various measures of dispersion - Standard Deviation and Variance
   Definitions, Merits, Demerit, Problems (grouped and ungrouped data)
3. Probability: Basic terminology, Addition theorem problems, Multiplication theorem problems, Bayes theorem problems (Derivations for theorems not included)

UNIT – II **12hrs**

Random Variable:

Discrete Random variable & Continuous Random variable

Probability Mass & Density functions.

Mathematical Expectation:

4. Mathematical Exception, Addition Theorem of expectation, Multiplication theorem of expectation. (Excluding Derivations – Problems only)

Theoretical Distributions**:**

1. Discrete distributions: Binomial distribution, fitting of binomial distribution
2. Poison distributions, fitting of poisson distribution
3. Normal Distribution: Chief characteristics of the normal distribution, area of a property, Importance and fitting of a normal distribution.

(Excluding derivations – Applications only for all distributions mentioned above)

UNIT – III **12hrs**

Correlation and Regression:

1. Simple correlations (definitions and types)
2. Karl Pearson coefficient of correlation
3. Rank correlation
4. Regression and regression lines (Problems only)

UNIT – IV **12hrs**

Testing of Hypothesis

1. Sampling distribution, the null hypothesis and type I and II errors,
2. Critical region and level of significance.

Tests of significance for large samples:

3. Test of single proportion
4. Test of significance of difference of proportions
5. Test of significance for single mean and difference of means
6. Test of significance for difference of standard deviations.

UNIT - V

Small Sample Tests

Chi – Square test:

1. Population Variance
2. Goodness of fit
3. Independence of attributes (Problems only)

T- test :

4. Single Mean
5. Difference means and paired t-test (Problems only)

F-test:

6. Test of significance based on equality of two variances(Problems only)

ESSENTIAL READING

1. Gupta, S. C. (2011). ***Fundamentals of statistics*** (pp. 18-1). New Delhi, India: Himalaya publishing house.
2. Gupta, S. P. (1978). **Statistical Methods** 1978. 46th Edition.

SUGGESTED READING

1. Deovre, J. (1987). **Probability and statistics for engineering and science**. *Brooks/Cole, Belmont, CA*.
2. Richard A. Johnson, Miller, Freund. **Probability & Statistics for Engineers**. PHI Publications

Ethical Hacking

Credits:4 **Semester: IV**
Course Code: CSIT23401 **No. of Lecture hours:60**

Objectives:

- To get familiarise with the essential terms in Hacking and Various phases of attacks
- To provide the details on Law and Punishment for Hacking.
- To explain the maintenance of access gained through hacking and the techniques used to avoid the traces of attacks in order to escape from the legal Punishment by a malicious hacker

Course Outcomes:

CO1: **Explain** essential terminology and phases of hacking
CO2: **Identify** different types of scanning methods
CO3: **Analyse** how to perform IP Spoofing
CO4: **Understand** Sniffing and Social Engineering
CO5: **Understanding** Session Hijacking and DDoS concepts

UNIT – I		**12Hrs**
1	Information Security Overview	2
2	Information Security Threats and Attack Vectors	2
3	Hacking Concepts, Types, Scope and Phases	2
4	Information Security Laws and Standards	2
5	Footprinting Concepts, Methodology, Tools	2
6	Footprinting Countermeasures	2

UNIT-II		**12Hrs**
1	Overview of Network Scanning	3
2	Understanding different techniques to check for Live Systems and open ports	2
3	Understanding Various Scanning Techniques	3
4	Understanding various IDS Evasion Techniques	2
5	Understanding Banner Grabbing	2

UNIT-III		**12Hrs**
1	Overview of Vulnerability Scanning	2
2	Using Proxies and Anonymizers for Attacks	2
3	Understanding IP Spoofing and Various Detection Techniques	2
4	Overview of Scanning Pen Testing	2
5	Overview of Sniffing Concepts	2
6	Understanding MAC Attacks , ARP Poisoning, MAC Spoofing Attacks	2

UNIT-IV		12Hrs
1	Sniffing Tools	2
2	Sniffing Countermeasures	2
3	Understanding various Techniques to Detect Sniffing	2
4	Overview of Social Engineering Concepts	2
5	Understanding various Social Engineering Techniques	2
6	Understanding Insider Threats	2

UNIT-V		12Hrs
1	Overview of of DOS and DDOS and its techniques	3
2	DoS and DDoS attack tools	2
3	Understanding the Botnet Network	2
4	Understanding Session Hijacking Concepts	2
5	Application level Session Hijacking	2
6	Network Level Session Hijacking	2

ESSENTIAL READING

1. Ethical Hacking and Countermeasure V9,by EC- Council.
2. Mc Clure, Stuart, Scambray, Joel and Kurtz, George. 2009. **Hacking Exposed.**7th Edition.New Delhi: McGraw Hill.

SUGGESTED READING

1. Engerbrestson, Patrick. 2011.**Basics of Hacking and Penetration**.Syngress
2. Walker, Matt.2012. C**ertified Ethical Hacker All-in-One**.McGraw Hill.

COMPUTER ORGANIZATION
(NEW SYLLABUS)

Credits: 3 **Semester: IV**
Course Code: CSIT20402 **No. of Lecture Hours: 45**

Objectives:

- To have a thorough understanding of the basic structure and operation of registers and control memory.
- To discuss in detail the operation of the arithmetic unit including the algorithms and implementation of fixed-point and floating-point addition, subtraction and multiplication.
- To study the different ways of communicating with I/O devices and standard I/O interfaces.
- To study the hierarchical memory system

Outcome:

CO1: Demonstrate knowledge of register organization of a basic computer system
CO2: Explain machine language of a basic computer system.
CO3: Appraise in-depth understanding of control unit organization and micro programmed control.
CO4: Apply various algorithms to perform arithmetic operations and propose suitable hardware for them
CO5: Analyze and emphasize various communication media in the basic computer system using design of various memory structures.

UNIT- I	**9Hrs**
1. Instruction codes-direct and indirect mode	1
2. Computer registers, 16-bit common bus system	1
3. Computer instructions	1
4. Timing and Control, Instruction cycle	2
5. Input Output and interrupt	1
6. Memory reference instruction	1
7. Design of Basic Computer, Design of Accumulator Logic	2

UNIT -II	**9Hrs**
1. Programming Basic Computer: Machine Language, Assembly language	1
2. Assembler	1
3. Program loops	1
4. Programming Arithmetic and Logic Operations	2
5. Subroutines	2
6. Input Output programming	2

UNIT- III	**9Hrs**
1. Micro programmed control: control memory	2
2. Address sequencing	2
3. Computer hardware configuration	2
4. Micro instruction format	1
5. Design of control unit and micro-program sequencer	2

UNIT –IV	**9Hrs**
1. Pipeline and vector processing-parallel processing	2
2. Arithmetic pipeline, Instruction pipeline	1
3. Computer arithmetic-addition and subtraction	1
4. Floating point Arithmetic operation-consideration, configuration, addition and Subtraction	1
5. Multiplication algorithm- Booth algorithm, Array Multiplier	3
6. Division Algorithm- Hardware implementation, algorithm and divide overflow	1

UNIT –V	**9Hrs**
1. Peripheral devices	1
2. I/O interfaces, Modes of transfer	1
3. Direct Memory Access	1
4. I/O processor- CPU IOP Communication	1
5. Memory organization-memory hierarchy	1
6. Main memory-design of RAM and ROM chips	2
7. Auxiliary memory, Cache and Associative memory	2

ESSENTIAL READING

1. Mano Morris, M. 2007. **Computer System Architecture**. Prentice Hall of India.

OPERATING SYSTEMS

Credits : 4 **Semester: IV**
Course Code: BS18430 **No. of Lecture Hours: 60**

Objective: To learn the core ideas in operating systems, process management, memory protection, CPU scheduling, concurrent programming, deadlocks and File systems.

Course Outcomes:
CO1: **Explain** functions, types and structures of operating system
CO2: **Analyze** various process management concepts including scheduling and synchronization
CO3: **Illustrate** the concepts of memory management and I/O system.
CO4: **Solve** issues related to file system interface.
CO5: **Choose** an appropriate Page replacement algorithm

UNIT – I	**12Hrs**
1. Introduction -Define Operating System, mainframe system, desktop systems	2
2. Multiprocessor systems, distributed systems, clustered systems	2
3. Real time systems , hand held systems	2
4. Operating system structures-system components	2
5. Operating system services, system calls	2
6. system programs, system structures , virtual machines	2

UNIT – II	**12Hrs**
1. Process concept-process concept, process scheduling	3
2. Operation on processes, cooperating processes	3
3. Inter process communication	3
4. Process scheduling-basic concepts, scheduling criteria, scheduling algorithms.	3

UNIT – III	**12Hrs**
1. Process synchronization-critical section problem	3
2. Semaphores, monitors	3
3. Deadlocks-deadlock characterization, methods for handling deadlocks	3
4. Deadlock prevention, Deadlock avoidance, Deadlock detection	3

UNIT – IV	**12Hrs**
1. File system-file concept, access methods	3
2. Directory structure, file system mounting, file system sharing.	3
3. File system implementation-file system structure, file system implementation.	3
4. Directory implementation, allocation methods, free space management	3
UNIT – V	**12Hrs**
1 Memory management-swapping, contiguous memory allocation	2
2 Fragmentation-internal and external fragmentation	2
3 Paging, segmentation, segmentation with paging.	3
4 Virtual memory management-demand paging	2

5. Page replacement algorithms, Thrashing and working set model. 3

ESSENTIAL READING

1. Silber Schatz Abraham, Galvin Peter, B. and Gagne Greg. 2006. **Operating System Concepts.** 6th Edition. India: Wiley.

SUGGESTED READING

1. Tanenbaum Andrew, S. 2001. **Modern Operating Systems.** New Delhi: Pearson Education.

MICROPROCESSORS AND MICROCONTROLLERS
(NEW SYLLABUS)

Credits : 3 **Semester: IV**
Course Code : BS20404 **No. of Lecture Hours: 45**

Objectives:

- To understand the microprocessor architecture with the help of 8086
- To study the concepts of interfacing techniques
- To study microprocessor programming applications
- To understand the differences between microprocessor and microcontroller
- To study the architecture of 8051 microcontroller

Outcomes:

CO1: **Explain** the architecture of 8086 based micro computer
CO2: **Develop** the assembly language programs for 8086 based micro computer
CO3: **Develop** the interfacing circuits for 8086 based micro computer
CO4: **Explain** 8086 based microcomputer interrupt mechanism
CO5: **Explain** the architecture of 8051 micro controller

UNIT-I		**9Hrs**
1.	Introduction of microprocessor, Evolution of microprocessors	1
2.	8086 architecture- internal block diagram, Signal description of 8086	2
3.	Memory segmentation and Register organization	2
4.	Operation of 8086 based microcomputer (minimum mode)	2
5.	Bus activities during read and write machine cycles	2

UNIT-II		**9Hrs**
1.	Addressing modes of 8086	1
2.	Introduction to programming, standard programming structures	1
3.	8086 instructions set. Data transfer and Arithmetic Instructions	2
4.	Logical, Shift, rotate and Loop instructions	2
5.	Flag manipulation and string instructions	1
6.	Assembly Language Programs	2

UNIT-III		**9 Hrs**
Digital Interfacing		
1.	Methods of parallel data transfer and implementing Hand-Shake data transfer	2
2.	8255 PPI internal block diagram, system connections, operational modes and initialization	2
3.	Interfacing a Microprocessor to keyboards	1
4.	Interfacing a Microprocessor to a Keyboard- Software Keyboard Interfacing	2
5.	Interfacing to Alphanumeric Displays, software-multiplexed LED displays	2

UNIT-IV		**9 Hrs**
1.	8086 Interrupts (external and Internal interrupts)	1
2.	Interrupt system- interrupt response- Interrupt Pointer Table	2
3.	8259A Interrupt priority controller- block diagram and signal description	1
4.	DMA data transfer, basic block diagram of DMA Controller operation	2
5.	Introduction to asynchronous serial data communication	1
6.	8251A USART: block diagram, signal description, initialization, sending and receiving data	2

UNIT-V		**9 Hrs**
8051 Microcontroller		
1.	Introduction to 8051 Microcontroller, difference between Microprocessor and Microcontroller	2
2.	8051 Microcontroller functional block diagram, description of various blocks/units	3
3.	Pin diagram and signal description of 8051 Microcontroller	1
4.	8051 registers, flags and stack operation	2
5.	Internal organization of 8051 memory (RAM and ROM)	1

ESSENTIAL READING

1. Hall Douglas V, SSSP Rao, 2012, **MICROPROCESSORS AND INTERFACING**. 3rd Edition, Mc Graw Hill (For units- I, II, III and IV)
2. Mazidi Muhammad Ali, Mazidi Janice Gillispie. 2005. **8051 Microcontroller & Embedded Systems** PHI (For unit V)

PYTHON PROGRAMMING
(NEW SYLLABUS)

Credits : 3 **Semester: IV**
Course Code : CSIT20403 **No. of Lecture Hours: 45**

Objectives:

- To help the students understand the fundamentals of object-oriented programming.
- To emphasize on learning important principles of software development and provide practice in developing small-scale programs.

Course Outcomes:

CO1: **Explain** the basics of Python Programming constructs.
CO2: **Sub divides** larger problems into smaller ones using functions
CO3: Apply various data structures for problem solving
CO4: **Apply** object-oriented programming features for solving a given problem
CO5: **Select** an appropriate exception handling depending on application and design file operations using Python standard library

UNIT – I		**9Hrs**
1.	**Basics of Python Programming:** Features of Python, History of Python, Future of Python, writing and executing first python program, Literal constants-Numbers, strings	2
2.	Variables and Identifiers, Data types, Input Operation, comments, Reserved words	1
3.	Operators and Expressions in Python, Other Data types-Tuples, dictionary, list. Type conversion	2
4.	Decision control statements- if statement, if-else statements, Nested if ,if-elif-else	1
5.	Basic Loop structure- while loop, for loop, selecting an appropriate loop, Nested loops, Break statement, continue statement, pass statement, else statement used with loops	3

UNIT- II		**9Hrs**
1.	**Functions and modules**-Need for functions, function definition, function call, variable scope and life time, Return statement, function definition using required argument, keyword argument, Default argument	2
2.	Lambda functions, Recursive functions- Greatest common Divisor, finding exponents Fibonacci series	2
3.	Modules—The from…import statement, Name of module, making your own module	1
4.	The dir( ), the Python module, modules and Namespaces	2
5.	Packages in Python, Standard Library modules, Function redefinition	2

UNIT- III		**9Hrs**
1.	**Python String: Introduction—**concatenating, Appending, multiplying strings, Strings are Immutable, string formatting operator	1
2.	Built-in String methods and functions, slice operation	1
3.	Ord( ) and chr( ) functions, in and not in operators, comparing and iterating	1

	strings	
4.	The String module, Regular Expressions—match( ),search( ),sub( ), findall( ), Finditer( ) functions, flag options. Meta characters in Regular expressions	2
5.	**Data Structures**-Sequence, Lists, Functional programming: filter(),map() and reduce()function, Tuple, sets	2
6.	Dictionaries—creating dictionary, adding, modifying ,sorting and deleting item in dictionary, looping and nested dictionary, built-in dictionary functions, difference between list and dictionaries	2

UNIT- IV **9 Hrs**

1.	**Classes and objects-**Introduction, defining classes, creating objects, data abstraction	1
2.	Class method and self argument, The __init__() method, class variables and object variables, The __del__() method, other special methods, public and private data members, private methods	2
3.	Calling a class method from another class method, built-in functions to check, Get, Set and Delete Class Attribute, Built-in class attribute	1
4.	**Inheritance :** Introduction, inheriting classes in Python, Types of Inheritance	2
5.	Composition or containership or complex objects, abstract classes and interfaces Meta class	2
6.	**Operator overloading**—Introduction, Implementing operator overloading, reverse Adding	1

UNIT- V **9 Hrs**

1.	**Error and Exception Handling**- Introduction to errors and exceptions, handling exceptions	1
2.	Multiple except blocks, multiple exception in a single block, except block without exception	1
3.	Raising Exceptions, Instantiating exceptions, handling exceptions in invoked functions, Built-in and user defined exceptions, the finally block	2
4.	**File Handling**-Introduction, File path, Types of Files-ASCII text file ,Binary file, opening and closing files	2
5.	**Reading and writing files**-write(), writelines(),append(),readline()	1
6.	File positions, renaming and deleting files, Directory methods	2

ESSENTIAL READING

1. Thareja, Reema. 2017. **Python Programming**. 3rd Edition. New Delhi: Oxford HED

SUGGESTED READING

1. BalaGuruSwamy, E. 2017. **Problem Solving and Python Programming**. 1st Edition. McGraw Hill Education
2. Dr. R. Nageshwara Rao. 2018. **Core Python Programming**. 2nd Edition. DreamTech Press

Ethical Hacking Lab

Credits: 1 **Semester: IV**
Course Code: CSIT23404 **No. of Practical hours: 30**

Objective: To get hands on experience with popular hacking tools and understand various hacking techniques in brief.

Outcome: Students will be able to learn some of the skills that you would require to become an expert in Ethical Hacking.

1. Using the Open-Source Reconnaissance tool Recon-ng to gather personal information
2. Enumeration resources in a Local Machine Using Hyena
3. Enumerating services on a target Machine
4. Open Source Information gathering Using Windows Command Line utilities
5. Collecting Information about Target Website Using Firebug
6. Network Scanning Using Nmap
7. Detecting Phishing using Netcraft
8. Sniffing Facebook Credentials using Social Engineering Toolkit
9. Basic Disk Encryption using VeraCrypt

UNIX SHELL PROGRAMMING LAB

Credits : 1 **Semester: IV**
Course Code: BS18431 **No. of Practical Hours: 30**

Objectives:

- To understand various commands and programming constructs of shell programming.
- To implement various algorithms of CPU scheduling and memory management algorithms.

Outcome: Students will be able to identify UNIX/Linux utilities and implement shell scripts to perform tasks that are more complex.

No of Hours	Topic
1	Introduction to Vi Editor, File and Directory related Commands.
2	Miscellaneous Commands
3	Arithmetic in Shell Scripts
4	Sample programs using Shell Script
5-6	Decision making in Shell Script
7-8	Loop control structures in Shell Script.
9-10	Implementation of UNIX System calls
11-12	Implementation of CPU Scheduling algorithms
13-15	Implementations of memory management algorithms

MICROPROCESSORS AND APPLICATIONS LAB

Credits : 1 **Semester: IV**
Course Code : CSIT18405 **No. of Practical Hours: 30**

Objectives:

- To study the hardware and architecture 8086 based microcomputer
- To write and execute various assembly language programs
- To practically experience the interfacing of various I/O devices

Outcome: Student will be able to explain the configuration 8086 based microcomputer system and execute number of ALPs.

No. of Hours	Topics
1.	Program for addition of two words.
2.	Program to add an array of n bytes.
3.	Program for subtraction of two words.
4.	Program for multiplication of two bytes.
5.	Program for multiplication of two words.
6.	Program for division of word by byte.
7.	Program for division of double word by word.
8.	Program to reverse a byte.
9.	Program to reverse a word.
10.	Program for Interfacing stepper motor
11.	Program to Display desired characters on the screen
12.	Program to determine the largest and smallest in an array.
13.	Program to ascending Order.
14.	Program to descending order
15.	Program to move a string

PYTHON PROGRAMMING LAB
(NEW SYLLABUS)

Credits : 1 **Semester: IV**
Course Code : CSIT20406 **No. of Practical Hours: 30**

Objectives:

- To strengthen problem solving ability by applying the characteristics of an object oriented approach in Python.
- To build software for real world applications.
- To implement frontend of an application

Outcome: Students will be able to develop applications using object-oriented concepts of varying complexities.

No. Of hours	Topics
1-3	Basic programs on data types and operators, decision and loop control structure
4-5	Programs on different functions and modules
6-7	Programs on various string operations, regular expressions and various data structures: lists, tuples.
8-9	Programs on dictionary operations and classes and objects
10-11	Programs on inheritance and operator overloading
12-13	Programs on errors and exception handling
14-15	Programs on file handling.