Course Code: CSE112 **Credit: 3**

Course Title: Computer Fundamentals **CIE Marks: 60**

SEE Marks: 40

Course Content / Syllabus:

https://drive.google.com/drive/folders/1M1MwQqUA1CNdj8mpilG2PfdhbaEnUiDD?usp=share_link

Introduction: Computer, Data processing, Characteristics of computer, Evolution and Computer generations, Computer generations.

Basic Computer Organization: Basic operations of computer systems, Basic organization of a computer system, Input unit, Output unit and their functions, Storage unit and its functions, Types of storage used, Arithmetic Logic Unit (ALU), Control Unit (CU), Central Processing Unit (CPU), and Computer as a system.

Input / Output (I/O) devices: Commonly used I/O devices.

Number system: Decimal, Binary, Octal and Hexadecimal number system, Convert a number's base, Floating-point representation, Reasons for using binary instead of decimal numbers, Basic arithmetic operations using binary numbers.

Processor & Memory: Internal structure of processor, determining the speed of a processor, Different types of processors available, determining the capacity of a memory, Different types of memory available, Secondary storage devices, Difference between sequential and direct access storage devices, Basic principles of operation, types, and uses of popular secondary storage devices, commonly used mass storage devices.

Software: Its relationship with Hardware, Various types of software and their examples, Relationship among hardware, system software, application software, and users of a computer system, Different ways of acquiring software, Various steps involved in software development, Firmware, Middleware.

Boolean algebra: Fundamental concepts and basic laws of Boolean algebra, Boolean function and minimization, Logic gates, Logic circuits and Boolean expressions, Combinational circuits and design.

Computer languages: Programming languages, machine, assembly, and high-level languages, assembler, compiler, linker, and interpreter, Concepts of object-oriented programming languages, related concepts such as Subprogram, Characteristics.

Operating System: Definition and need for operating system, Main functions of an operating system, Process management, Memory management, File management, Security, Command interpretation module, Some commonly used OS capability enhancement software, Some popular operating systems

Data Communication and Computer Networks: Types of computer networks, Communication protocols and their use in computer networks, Internetworking tools and their use in building large computer networks, Characteristics and advantages of distributed data processing.

Algorithm and Flowcharts: Develop the logical concept of problem solving, Pseudocode, Flowchart

Cyber Security, Computer and network security, two factor authentication (2FA), Intellectual Property, ICT ACT and Digital security act.

Course Description / Rationale:

To make effective communication between the gadgets it is critical to play out every single essential apparatus and its fundamental design precisely. Therefore, comprehending the system structure, segments, and other applicable devices and procedure is an absolute necessity. This course will give a basic knowledge about computer hardware, software, organization, computer arithmetic and operating system.

Course Objectives:

To provide a solid conceptual understanding of the fundamentals of data communications. More specifically,

- To learn the basic concepts of computer fundamentals
- To learn the number systems and basic operations.
- To learn Microsoft office software.
- To learn types computer memory and storages.
- To learn the concepts of computer communication.
- To learn the basic cyber security concept and the digital security act.

Course Learning Outcomes (CLO's): (at the end of the course, the student will be able to do)

CLO1	Explain the basic computer terminology, hardware, software, networking, and cyber security, awareness and cyber acts.
CLO2	Determine the conversion of different number systems
CLO3	Illustrate different Boolean algebra and design logic circuits
CLO4	Apply the basic concepts of flowcharts, pseudocode in developing solutions

Program Outcomes (PO's):

Program Outcomes are reported in Appendix-I.

Content of the course:

SL	Course Content (As summary)	Hrs	CO's
1.	Overview of basic computer terminology, software, networking, and cyber security, awareness and cyber acts.	24	CLO-1
2.	Number System, Floating-point representation	6	CLO-2
3.	Logic Circuit, Boolean Algebra, Hardware	8	CLO-3
4.	Basic concepts of flowcharts, pseudocode in developing solutions	8	CLO-4

CO PO Mapping

	CO1	CO2	CO3	CO4
PO1: Engineering knowledge	√			
PO2: Problem analysis		√		
PO3: Design/development of solutions			√	

PO4: Investigation				√
PO5: Modern tool usage				
PO6: The engineer and society				
PO7: Environment and sustainability				
PO8: Ethics				
PO9: Individual work and teamwork				
PO10: Communication				
PO11: Project management and finance				
PO12: Life-long learning				

Mapping Course Outcome (COs) with the Teaching-Learning and Assessment Strategy:

CO's	Teaching Learning Strategy	Assessment Strategy	Corresponding PO number	Domain Level/ Learning Taxonomy	Level of Knowledge Profile	Complex Engineering Problems	Complex Engineering Activities
CO1	● Interactive discussion using Online/multimedia or whiteboard ● Group discussion and presentation regarding diverse problems and corresponding lectures. ● Evaluation of class performances to reach each student in a class for every topic.	Midterm, Final Exam	PO1	Remember, Understand	K1-K4	P1	A1
CO2	● Interactive discussion using Online/multimedia or whiteboard ● Evaluation of class performances to reach each student in a class for every topic.	Midterm, Final Exam	PO2	Analyze, Apply	K1-K4	P2	A2
CO3	● Interactive discussion using Online/multimedia or whiteboard ● Group discussion and presentation regarding diverse problems and corresponding lectures. ● Evaluation of class performances to reach each student in a class for every topic.	Final Exam	PO3	Apply	K5	P3	A3
CO4	● Interactive discussion using Online/multimedia or whiteboard ● Group discussion and presentation regarding diverse problems and corresponding lectures. ● Evaluation of class performances to reach each student in a class for every topic.	Final Exam	PO4	Apply	K5	P4	A4

Mapping Course Learning Outcome (CLOs) with the Teaching-Learning and Assessment Strategy:

Course Delivery Plan /Lesson Deliver Plan

Week/Lesson (hour)	Discussion Topic and Book Reference	Students Activities during Online and Onsite and TLA	Mapping with CLO and PLO	Assessment Plan
1	Les. 1 (Theory)	● Introduction and Motivation (Theory) ● Course Outline Discussion ● Introduction to Computer ● Real-life Application Discussion	TLA1	MCQ for overall assessment of class prior to class test
	Les. 2 (Theory)	● Basic Computer Organization ● How Computer Organization	TLA1, TLA2	
2	Les. 3 (Theory)	● I/O Devices		Class Test #1
	Les. 4 (Theory)	● Processor and Memory	TLA1, TLA3, TLA4	
3	Les. 5 (Theory)	● Computer Software	TLA1, TLA3, TLA4	
	Les. 6 (Lab)	● Working with productivity package Microsoft office (word) and using Windows ● Assign Team Project		
4	Les. 7 (Theory)	● Number system and conversions ● Application of number	TLA1, TLA2	Class Test #2
	Les. 8 (Lab)	● Working with productivity package MS Excel and MS PowerPoint	TLA2, TLA3, TLA4	
5	Les. 9 (Theory)	● Addition and subtraction with 2's Complements ● Floating-point representation of numbers	TLA1, TLA3, TLA4	
	Les. 10 (Lab)	● Working with productivity package MS Excel and MS PowerPoint	TLA2, TLA3, TLA4	
6	Les. 11 (Theory)	● Computer Arithmetic	TLA1, TLA3, TLA4	
	Les. 12 (Lab)	● Formal Email Writing	TLA2, TLA3, TLA4	

Week/Lesson (hour)	Discussion Topic and Book Reference	Students Activities during Online and Onsite and TLA	Mapping with CLO and PLO	Assessment Plan
7,8	**MID TERM EXAMINATION**			
9	Les. 13 (Theory)	● Boolean Algebra	TLA1, TLA3, TLA4	
	Les. 14 (Presentation)	● Computer Components draw in a paper ● Assign Team Work ● Make a poster and present and describes all the components	TLA2, TLA3, TLA4	
10	Les. 15 (Theory)	● Logic Circuits	TLA1, TLA3, TLA4	
	Les. 16 (Presentation)	● Computer Components draw in a paper ● Assign Team Work ● Make a poster and present and describes all the components	TLA1, TLA3, TLA4	
11	Les. 17 (Theory)	● Secondary Storage		Class Test #3
	Les. 18 (Theory)	● Computer Operating System	TLA1, TLA3, TLA4	
12	Les. 19 (Lab)	● Operating system installation	TLA2, TLA3, TLA4	
13	Les. 20 (Theory)	● Computer Communication	TLA1, TLA3, TLA4	
	Les. 21 (Lab)	Review Class	TLA3, TLA4	
14	Les. 22 (Theory)	● Develop the logical concept of problem solving ● Pseudocode, Flowchart	TLA1, TLA3, TLA4	
	Les. 23 (Lab)	● Using Flow Charting tools e.g. vision ● Practical drawing flowchart using tools	TLA1, TLA3, TLA4	
15	Les. 24 (Theory)	● Cyber Security and Awareness	TLA1, TLA3, TLA4	

Week/Lesson (hour)	Discussion Topic and Book Reference	Students Activities during Online and Onsite and TLA	Mapping with CLO and PLO	Assessment Plan
	Les. 25 (Theory)	● Cyber Law		
16, 17	Final Examination			

Assessment Pattern:

Assessment Task	CO's				Mark (Total=100)
	CO1	CO2	CO3	CO4	
Attendance	--	--	--	--	7
Class Test (CT1, CT2, CT3)	--	--	--	--	15
Assignment	--	--	--	--	5
Presentation	--	--	--	--	8
Midterm Examination	15	10	--	--	25
Semester Final Examination	20	00	10	10	40
Total Mark	35	10	10	10	100

CIE – Breakdown (Theory) [60 marks]

Bloom's Criteria	Attendance (07)	Class Test (15)	Assignment (05)	Presentation (08)	Mid Exam (25)
Remember		05			10
Understand		05		02	9
Apply		05		03	6
Analyze				03	
Evaluate					
Create			05		

SEE – Semester End Examination [40 marks] {Theory}

Bloom Criteria	Score for the Test
Remember	13

Understand	17
Apply	10
Analyze	--
Evaluate	--
Create	--

Learning Materials:

Textbook

1. Computer Fundamentals by Pradeep K. Sinha, 6th Edition.

Reference Books

1. Computer Fundamentals by Dr. Mohammad Lutfor Rahman
2. Computer Fundamentals: 1000+ MCQ Questions-Answers and 400+ Interview Questions-Answers - Professor Dr. Md. Ismail Jabiullah
3. Introduction to Computer by Peter Norton.
4. Introduction to Information System by James A. O'Brien, 8th Edition.
5. Fundamentals of Computers by V. Rajaraman and N. Adabala, 6th Edition.