

Foundations of Computer Systems (2-0-1-3)

Course Description:

- The course Introduce students to the basics of Computer Systems.
- A foundation from which they can appreciate the relevance and interrelationships of further courses in the field.
- This course provides an insight into the general structures of operating systems, database management systems, and computer networks.
- To enable the student to identify the interrelationships between Computer hardware and software.
- To enable the student to identify the interrelationships of further courses in the MCA program.

Course Outcomes:

COs	Description
CO1	Understand the basic components of computer systems and its functionality.
CO2	Demonstrate the functions of operating system and its role as a resource manager to execute any application.
CO3	Understand the need for database storage and learn to retrieve using SQL.
CO4	Implement the connection between operating systems, computer networks and database management through a case study

CO-PO Mapping

PO/PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO	3	-	-	-	-	-	2
CO1	3	-	-	-	-	-	2
CO2	3	2	3	-	-	-	2
CO3	3	2	3	-	-	-	2
CO4	3	2	3	-	-	-	2
CAM	3	2	3	-	-	-	2

Syllabus:

Unit I

Basics of Computers, Generations, and Classifications of Computers, Computer System hardware, Inside a compute cabinet, Input/ Output units, Computer Memory, Processor,

Instruction format, Computer Architecture. Microcomputers: Digital Signal Processor, Microcontrollers, Smart Cards, Radio Frequency Identification.

Lab Component-8085 Assembly Programs

Unit II

Data Representation, Binary Arithmetic, Binary coding schemes, Logic Circuits, and gates.

Unit III

Types of Software, Operating System, Different types and functions, Process management, memory management, File and device management, protection and security, UNIX Operating System, Utilities, Microkernel based OS.

Lab Component - Linux Commands

Unit IV

Data, Information and Knowledge, Introduction to Database Management Systems, Data Models, Introduction to SQL: Datatypes, Classification of SQL-DDL with constraints, DML, DCL, TCL.

Lab Component - SQL Language

Unit V

Computer Networks, Data transmission media, network types and topologies, Network devices, ISO/OSI and TCP/IP models, Protocols, Voice and data communication, Wireless networking, Cellular communication, Bluetooth, Mobile communication.

Textbooks / References:

1. Fundamentals Computers, V Rajaraman, Niharika Adabala, Phi Learning Pvt. Ltd.
2. Computer Fundamentals, Anita Goel, Pearson.
3. J. Glenn Brookshear," Computer Science: An Overview", Addison-Wesley, Twelfth Edition, 2014.

Faculty Information

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AMRITA VISHWA VIDYAPEETHAM
Amrita Online - Course Plan

Week	Topic	Learning Objectives	eLearning Content	Video Lectures	Quiz/ Assignment	
1	Introduction to Computers	To understand basics of evolution of computer and computer hardware	7 Videos 1 Readings 1 Quiz	1. Introduction	Quiz 1	
				2. Introduction to Computers		
				3. Classification of Computers		
				4. Computer Memory		
2	Computer Architecture	To get an overview of computer architecture and instruction format.	6 Videos 1 Readings 1 Quiz	1. Instruction format	Quiz 2	
				2. Computer architecture		
				3. Program Execution	Lab Assignment 1	
				4. 8085 Instructions		
3	Data Representation	To get an overview on the different types of data and its representations	5 Videos 1 Readings 1 Quiz	1. Introduction to Data Representation	Quiz 3	
		To understand how unsigned numbers are represented in computers		2. Unsigned Number Representation		
		To understand how signed numbers are represented in computers		3. Signed Number Representation		
		To understand the text data representation		4. Text Representation		
		To understand the image and video data representations		5. Image and Video representation		
4	Types of Softwares	Introduction to system software	4 Videos 1 Readings 1 Quiz	1. Operating system concepts	Quiz 4	
				2. Functions of OS		
				3. Memory Management		
5	OS Functions	To understand OS functions concepts	4 Videos 1 Readings 1 Quiz	1. Process management	Assignment 1	
				2. File management	Quiz 5	
				3. Data Protection		
				4. Data security		
6	Unix Operating System	An introduction to UNIX OS	4 Videos 1 Reading 1 Quiz	1. Unix system	Quiz 6	
				2. Basic unix commands	Lab Assignment 2	

7.	Binary Arithmetic and Coding	Basics of binary operations and coding schemes	6 Videos 2 Reading 1 Quiz	1. Number System and base conversions	Quiz 7
				2. Binary Arithmetic	
				3. Binary Coding schemes	
8.	Digital logic	Introduction to digital systems	6 Videos 2 reading 1 Quiz 1 Assignment	1. Introduction to DSD 2. Boolean Algebra 3. Logic Gates 4. Logic circuits	Assignment 2 Quiz 8
9	Database Management Systems	To understand basic concepts of DBMS	5 Videos 1 Readings 1 Quiz	1. Data properties	Quiz 9
				2. DBMS concepts	
				3. DBMS schemas	
				4. Views of data	
				5. Data models	
10	RDBMS	An introduction to RDBMS	4 Videos 1 Readings 1 Quiz	1. Introduction to RDBMS 2. RDBMS constraints. 3. RDBMS_database Keys	Quiz 10
11	Familiarizing SQL language	Introduction to SQL Commands Giving an overview on the SQL keys Creating and deleting relations in a database	4 videos 1 Readings 1 Lab 1 Quiz	1. Introduction to SQL Commands	Quiz 11
				2. SQL Keys	
				3. DDL Queries - CREATE and DROP	
				4. DML Queries- INSERT	
		Inserting tuples into a relation using INSERT query			Lab Assignment 3
12	Introduction to Computer Networks	Introducing the concepts of computer networks	4 Videos 1 Readings 1 Quiz	1. Introduction to computer networks	Quiz 12
				2. Transmission media	
				3. Guided media and unguided media 2. Network topologies	
				3. Network types	

13	Layered architecture	Layered Architecture	4 Videos 1 Readings 1 Quiz	1.ISO OSI	Quiz 13
				2.TCP/IP	
				3.Comparison	
14	Wireless networking	Introduction to wireless communication, Basics of cellular and bluetooth	5 Videos 1 Readings 1 quiz	1. Wireless LAN- IEEE802.11	Quiz 14
				2.Architecture and layers	
				3. Addressing mechanism	
				4. Cellular communication	
				5. Bluetooth Architecture	
				6. Bluetooth layers	

Evaluation Policy

Internal	Quiz: Total 14 Quizzes (Best 7 quizzes will be selected for internal evaluation)	30%	100 %
External	End Semester Exam MCQ's (50 marks) Descriptive (20 marks)	70%	

Assignments: 3 Lab + 2 Theory (Non-graded but mandatory)