



*R 20 Regulations*

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**  
**(Established by Govt. of A.P., ACT No.30 of 2008)**  
**ANANTHAPURAMU – 515 002 (A.P) INDIA**

**Computer Science & Engineering**

Course Code	Computer Organization		L	T	P	C
20A05303	(Common to CSE, IT, CSE( DS), CSE (IoT), CSE (AI), CSE (AI & ML) and AI & DS)		3	0	0	3
Pre-requisite	Digital Electronics	Semester	III			
Course Objectives:						
<ul style="list-style-type: none"><li>To learn the fundamentals of computer organization and its relevance to classical and modern problems of computer design</li><li>To understand the structure and behavior of various functional modules of a computer.</li><li>To learn the techniques that computers use to communicate with I/O devices</li><li>To acquire the concept of pipelining and exploitation of processing speed.</li><li>To learn the basic characteristics of multiprocessors</li></ul>						
Course Outcomes (CO):						
After completion of the course, students will be able to <ul style="list-style-type: none"><li>Understand computer architecture concepts related to the design of modern processors, memories and I/Os</li><li>Identify the hardware requirements for cache memory and virtual memory</li><li>Design algorithms to exploit pipelining and multiprocessors</li><li>Understand the importance and trade-offs of different types of memories.</li><li>Identify pipeline hazards and possible solutions to those hazards</li></ul>						
UNIT - I	Basic Structure of Computer, Machine Instructions and Programs		8Hrs			
<b>Basic Structure of Computer:</b> Computer Types, Functional Units, Basic operational Concepts, Bus Structure, Software, Performance, Multiprocessors and Multicomputer. <b>Machine Instructions and Programs:</b> Numbers, Arithmetic Operations and Programs, Instructions and Instruction Sequencing, Addressing Modes, Basic Input/output Operations, Stacks and Queues, Subroutines, Additional Instructions.						
UNIT - II	Arithmetic, Basic Processing Unit		9Hrs			
<b>Arithmetic:</b> Addition and Subtraction of Signed Numbers, Design of Fast Adders, Multiplication of Positive Numbers, Signed-operand Multiplication, Fast Multiplication, Integer Division, Floating-Point Numbers and Operations. <b>Basic Processing Unit:</b> Fundamental Concepts, Execution of a Complete Instruction, Multiple-Bus Organization, Hardwired Control, and Multi programmed Control.						
UNIT - III	The Memory System		8Hrs			
<b>The Memory System:</b> Basic Concepts, Semiconductor RAM Memories, Read-Only Memories, Speed, Size and Cost, Cache Memories, Performance Considerations, Virtual Memories, Memory Management Requirements, Secondary Storage.						
UNIT - IV	Input/Output Organization		8Hrs			
<b>Input/Output Organization:</b> Accessing I/O Devices, Interrupts, Processor Examples, Direct Memory Access, Buses, Interface Circuits, Standard I/O Interfaces.						
UNIT - V	Pipelining, Large Computer Systems		9 Hrs			
<b>Pipelining:</b> Basic Concepts, Data Hazards, Instruction Hazards, Influence on Instruction Sets. <b>Large Computer Systems:</b> Forms of Parallel Processing, Array Processors, The Structure of General-Purpose multiprocessors, Interconnection Networks.						
Textbooks:						



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1. Carl Hamacher, Zvonko Vranesic, Safwat Zaky, “Computer Organization”, 5 <sup>th</sup> Edition, McGraw Hill Education, 2013.
Reference Books:
1. M.Morris Mano, “Computer System Architecture”, 3 <sup>rd</sup> Edition, Pearson Education. 2. Themes and Variations, Alan Clements, “Computer Organization and Architecture”, CENGAGE Learning. 3. SmrutiRanjanSarangi, “Computer Organization and Architecture”, McGraw Hill Education. 4. John P.Hayes, “Computer Architecture and Organization”, McGraw Hill Education
Online Learning Resources:
<a href="https://nptel.ac.in/courses/106/103/106103068/">https://nptel.ac.in/courses/106/103/106103068/</a>