

1.	Title of the course	Computer Organization and Processor Design
2.	Course number	EE311L
3.	Structure of credits (L-T-P-C)	3-0-0-3
4.	New course/modification to	New
5.	To be offered by	Electrical Engineering
6.	Proposed by	Vikramkumar Pudi
7.	Prerequisite	None
8.	Course Objective(s): To discuss the working principles and design methodology of a computer processor. To provide hands-on skills on designing modern processors.	
9.	Course Content: Introduction and performance: components of a computer, Moore's law, technology trends, central processing unit (CPU) performance, Amdahl's law, performance metrics, bench-marking; Instruction sets architecture: reduced instruction set computer (RISC) and complex instruction set computer (CISC) paradigms, registers, address space, encoding/decoding of instructions, addressing modes; Data and control path: von Neumann architecture, single-cycle design, multi-cycle design, control unit, pipeline micro-architecture, hazards; Memory hierarchy: cache, main memory, virtual memory, non-volatile memory; Processor design using hardware description language (HDL): instruction fetch and decode unit design, arithmetic and logic unit design, load and store circuit design, component integration, multi-cycle processor design, simulation and verification of processor.	
10.	Textbook(s): 1. Patterson D and Hennessy J L, Computer Organization and Design: The Hardware/Software Interface, 5th Edition, Morgan Kaufmann (2013). 2. Peter J A, Digital Design: An Embedded Systems Approach using Verilog, Morgan Kaufmann (2007).	
11.	Reference(s): 1. Stallings W, Computer Organization and Architecture: Designing for Performance, 11th Edition, Pearson Education (2022). 2. Chandrakasan A, Bowhill W J and Fox F, Design of High Performance Microprocessor Circuits, IEEE Press (2001). 3. Tredennick N, Microprocessor Logic Design: The Flowchart Method, Digital Press (1987).	