1.	Title of the course	Computer System Design
2.	Course number	CS401L
3.	Structure of credits	3-0-0-3
4.	Offered to	UG
5.	New course/modification to	Modification To CS4101/8
6.	To be offered by	Department of Computer Science and Engineering
7.	To take effect from	July 2022
8.	Prerequisite	Nil
9.	**Course Objective(s):** To learn the design of hardware and software components to build a computer system and to develop abilities to diagnose and fix the design and integration errors.	
10.	**Course Content:** Introduction: Computer system components, Interaction process, and System design flow; Digital logic design: Data representation, Logic optimization, and Data and control path logic block design; Processor Design: Arithmetic circuit design, Data-path design, Control-path design, and Memory system design; High-level synthesis: Design specification, Synthesis to a gate-level netlist, Design verification using simulation, and Clock-tree synthesis and timing analysis; Machine language: Instruction set architecture, Instruction format, Addressing mode, Registers, Memory alignment and address space; Assembler: Symbol table, Parsing process, and Code generation; System integration: High-level programming language, Cross-compilation tool-chain, Interaction of virtual machine, operating system, and the user program, and System testing.	
11.	**Textbook(s):** 1. Nisan N and Schocken S, *The Elements of Computing Systems: Building a Modern Computer from First Principles*, MIT Press (2008).	
12.	**Reference(s):** 1. Bryant R E and O'Hallaron D R, Computer Systems: A Programmer's Perspective, Pearson Publishing (2010).	