Course Name	DIGITAL DESIGN & COMPUTER ARCHITECTURE		Course Code	ITEC-252		
Credit Hours	3		Contact Hours	Lec	Lab	Total
				2	2	4

| Offered as | ☐ University Requirement ☒ College Requirement ☒ Program Requirement ☒ Core ☐ Elective |
| | ☒ ITEC ☒ COMP ☐ CNET |

Level	4	Prerequisite	NIL

Course Description:

This course addresses principles of digital design, such as combinational and sequential logic, and digital building blocks, and builds on this to introduce various processor architectures, and the interfaces between hardware and program code. Initially, the various number system suitable for representing information in digital systems and binary codes are illustrated with its conversions and arithmetic operations. Then, this course introduces the basic postulates of Boolean algebra and demonstrates the correlation between Boolean expressions and their corresponding logic diagrams. In addition, this course covers canonical and standards forms using the Karnaugh mapping method for simplifying Boolean functions. Besides, this course deals with various combinatorial circuit components like the adder, subtractor, decoder, encoder, multiplexer, and de-multiplexer and sequential circuit components such as registers, shift registers, and counters along with memory circuits. In addition, this course discusses MIPS and AI-32 architectures, assembly and machine languages, operands. Lastly, it will explain compile and run a program using high level code and assembly code.

Upon completion, the student will be able to:

♦ Understand the concepts of digital and number systems using various techniques in detail.

♦ Outline Boolean algebra, Boolean function, Canonical, and Standard forms using the Karnaugh Map.

♦ Identify various types of registers, counters, and storage elements including flip flops, laches, and memory.

♦ Implement the design of combinational and sequential circuits using logic gates.

♦ Learn the different architectures, microarchitectures, assembly language, and instructions to compile and run a program on modern computers.

Assessment Methods	☒ Mid Exam	15%	☒ Assignment-1	10%	☒ Mini-project	15%
			☒ Lab Exam	20%	☒ Final Exam	40%

Textbook:

♦ Digital Design with an Introduction to the Verilog HDL, VHDL, and System Verilog by Morris Mano, Micheal Ciletti, 6th Edition, Pearson, 2018, ISBN: 978-0134549897

♦ Computer Architecture, Sixth Edition: A Quantitative Approach by John Hennessy, David Patterson, 6th Edition, Morgan Kaufmann, 2019, ISBN: 0128119055

References:

♦ Computer Organization and Architecture: Designing for Performance by William Stallings, 11th Edition, Pearson, 2019, ISBN: 0134997190

♦ Digital Design and Computer Architecture, ARM Edition, by Sarah L. Harris, David Money Harris, Morgan Kaufmann Publishers, 2018, ISBN: 0128000562