

COE 305 : MICROCOMPUTER SYSTEM DESIGN

Syllabus - Term 042

Catalog Description:

Microprocessor architecture and organization, Bus architecture, types, and buffering techniques. Memory and I/O subsystems, organization, timing, and interfacing. Peripheral controllers and programming. Practice of the design of a microprocessor system design, testing, debugging, and reporting.

Prerequisite: COE 205.

Text Book: The 8086/8088 Family: Designing, Programming, and Interfacing, Prentice-Hall by John Uffenbeck.

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Lecture Time 1:10-2. **SMW** **Lecture Location:** 24/158

Tentative Grading Policy

Laboratory	20%
Attendance, Quizzes & Assignments	20%
Exam I	20%
Exam II	20 %
Final	20%

Course Objectives:

To introduce the fundamental hardware and software concepts needed for the design of dedicated microprocessor systems.

Course Topics:

- 1. Introduction to Microcomputer System (Chapter 1)**
Overview of microcomputer systems, Historical background, Von Neumann architecture, instruction processing, fetch and execute cycles, evolution of Intel 80x86 family of microprocessors.
- 2. 8086 Processor Architecture (Chapter 3 and handouts)**
CPU Architecture – Programmer’s model, 8086 hardware details – Pinouts and Pin function, Clock generator (8284A), Bus buffering and latching, System bus timing - Processor Read & Write bus cycles, Ready and wait state, Minimum and Maximum mode operations.
- 3. Memory Interfacing (Chapter 7)**
Basic Concepts, Memory devices – ROM, SRAM, DRAM devices, Memory pin connections, Memory read and write timing diagrams, Address decoding techniques – Random logic (using Logic gates) decoding, block decoding (using 74LS138, 74LS139 decoders), PROM address decoding, PLD programmable decoding (using PLAs & PALs), 8086 processor-Memory interfacing – even and odd memory banks.
- 4. Basic I/O Interfacing (Chapter 8)**
Basic Concepts, Parallel I/O, Programmed I/O, I/O port address decoding, The 8255A Programmable Peripheral Interface(PPI), Interface examples – Keyboard matrix interface, Printer interface and display interface, The 8254 Programmable Interval Timer (PIT).
- 5. Interrupts & Direct Memory Access (Chapter 9)**
Basic concepts, Interrupt driven I/O, Software & Hardware interrupts, Interrupt vectors and vector table, Interrupt processing, The 8259A Programmable Interrupt Controller (PIC), Basic DMA operation, The 8237 DMA Controller.
- 6. Serial I/O Communication (Chapter 10)**
Basic concepts, Asynchronous & Synchronous communication. Physical communication standard-EIA RS232, Programmable communication interface – Universal Asynchronous Receiver / Transmitter.