

**King Fahd University of Petroleum & Minerals**  
Electical Engineering Department  
**EE 390-01 Digital System Engineering (Term 031)**

**Instructor** : Dr. Mohamed Mohandes      **Subject** : EE 390-3      **Room**: 19-417  
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TOPICS	Week	DATE	LAB Experiments
Overview of $\mu\text{C}/\mu\text{P}$ systems; 8086/8088 $\mu\text{P}$ internal architecture, software model; memory addresses;	1	Sep. 13-17	No Lab.
Data types, Memory segments; Internal registers and Flags; Memory address and Stack (briefly);	2	Sep. 20-24	No Lab.
Addressing modes; ----- Brief discussion on DEBUG commands	3	Sep. 27 – Oct. 1	<i>Lab.1: PC Hardware and Operating Systems</i>
Data transfer instructions; Arithmetic instructions; Logical instructions;	4	Oct. 4-8	<i>Lab.2: MS-DOS Debugger (DEBUG) and Turbo Debugger (TD)</i>
Shift and Rotate instructions; Flag control, Compare instruction; Introduction to EDIT, TASM, TLINK;	5	Oct. 11-15	<i>Lab.3: Addressing Modes and Data Transfer using Turbo Debugger (TD)</i>
Jump Instructions; Stack instructions and Subroutines; Loop and Strings instructions;	6	Oct. 18-22	<i>Lab.4: Arithmetic Instructions using Turbo Debugger Program</i>
Progring using Interrupt interface ----- -----	7	Oct. 25-29 (EXAM 1)	<i>Tutorial 1</i>
8088 and 8086 Hardware Minimum and Maximum Modes	8	Nov. 1-5	<i>Lab.5: Logic, Shift and Rotate instructions using TD and Introduction of Turbo Assembler.</i>
Memory Interface; System clock, Bus cycle;	9	Nov. 8-12	<i>Lab.6: Flag Control, Jump, Loop and Call Instructions using Turbo Assembler</i>
<i>Eid Vacation</i>			
Hardware organisation of memory; Read and Write Bus cycles; Memory interface circuit;	10	Nov. 30-Dec.3	<i>No. Lab</i>
ROM,PROM,EPROM (prog. storage); RAM,SRAM,DRAM (data storage);	11	Dec. 6-10	<i>Lab.7: Introduction to 16-bit Microprocessor Trainer</i>
I/O Interface, Isolated min & max mode; I/O instructions, I/O bus cycle; Byte-wide output and input circuit;	12	Dec. 13-17	<i>Lab.8: Memory Mapping (extra handout will be supplied)</i>
The 8255A (PPI) I/O interface chip; 8255A parallel I/O ports;	13	Dec. 20-24 (EXAM 2)	<i>Lab.9: Parallel Input/output and Interfacing Applications</i>
Memory mapped I/O Interface; Serial comm. Interface, DAC and ADC;	14	Dec. 27 – 31	<i>Lab.10: Pulse Width Modulation</i>
Interrupt interface Review	15	Jan. 3 - 7	LAB FINAL

**Textbook** : 'The 8088 and 8086 Microprocessors' by Triebel and Singh 3<sup>rd</sup> edition.

**Grading**: Assignment **3%** ; Class Work **12%** ; Major 1 **15%** ; Major 2 **15%** ; Final-exam **35%** ; Lab **20%**

**Major Exams**: **Exam 1**; Saturday; **25<sup>th</sup> October**; 5:30 - 7:00 PM ;

**Exam 2**; Saturday; **20<sup>th</sup> December**; 7:00 - 9:30 PM ;

**Absences**: University rules: -- 6 unexcused absences → **Warning** ; -- 9 unexcused absences → **DN**.