

COE 205 Computer Organization & Assembly Language – Fall 2004

Computer Engineering Department
College of Computer Sciences & Engineering
King Fahd University of Petroleum & Minerals

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Office Hours: SMW 8:00 – 10:00 am or by appointment
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Catalog Description

Introduction to computer organization. Octal and hexadecimal number systems, ASCII codes. Assembly language programming, instruction formats and types, memory and I/O instructions, arithmetic instructions, addressing modes, stack operations, and interrupts. ALU and control unit design. RTL, microprogramming, and hardwired control design. Practice of assembly language programming. Prerequisite: COE 200.

Course Objectives

To understand the organization of a computer and the architecture of the Intel 80x86.
To design, implement, and debug non-trivial assembly language programs.

Prerequisites

Knowledge of the basics of high-level language programming and software development.
Familiarity with the PC and its operating system.

Textbooks

Sivarama P. Dandamudi, *Introduction to Assembly Language Programming: From 8086 to Pentium Processors*, Springer, 1998. ISBN: 0-387-98530-1.

Vincent P. Heuring & Harry F. Jordan, *Computer Systems Design and Architecture*, Addison Wesley, 1997. ISBN: 0-8053-4330-X.

Grading

Laboratory	15%
Assignments	15%
Quizzes	10%
Exam I	15% or 20%
Exam II	20% or 15%
Final Exam	25%

Assignments should be submitted at the beginning of class time in the specified due date.
Late programming assignments are accepted, but will be penalized 10% for each late day, up to a maximum of five late days.

Course Subjects

Introduction to Computer Organization & Assembly Language

- Assembly language versus high level language programming
- Basic Components: processor, memory, bus, input and output devices

Internal Data Representation

- Unsigned & signed integer representation
- Integer arithmetic
- Character representation
- Floating-point number representation

Assembly Language Concepts

- Assembly language statements, directives versus instructions
- Overview of assembly language instructions
- Defining constants, storing multibyte data
- Instruction formats, opcodes & operands
- Addressing Modes

Pentium Assembly Language Programming

- Intel 80x86 processor family
- Pentium processor and registers
- Pentium memory architecture
- Logical and bit operations
- Arithmetic instructions and flags
- Selection and iteration
- String processing

Procedures and the Stack

- Pentium implementation of the stack
- Stack operations
- Procedures and parameter passing
- Local variables

Interrupts and I/O

- Taxonomy of interrupts
- Software and hardware interrupts
- Interrupt processing
- Keyboard and text output
- Peripheral support chips
- Direct Memory Access (DMA)

Processor and Control Unit Design

- Register transfer
- Data-path design
- 1-bus, 2-bus, and 3-bus organization
- Hardwired control unit design
- Microprogrammed control unit design

Memory System Design

- Main memory, SRAM, DRAM & ROM