

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

COE 202: Fundamentals of Computer Engineering – Summer 071

Syllabus

Catalog Description

Introduction to Computer Engineering. Digital Circuits. Boolean algebra and switching theory. Manipulation and minimization of Boolean functions. Combinational circuits analysis and design, multiplexers, decoders and adders. Sequential circuit analysis and design, basic flip-flops, clocking and edge-triggering, registers, counters, timing sequences, state assignment and reduction techniques. Register transfer level operations. Machine-level programming.

Prerequisite: PHYS 102.

Text Book: Morris Mano and Charles Kime, “Logic and Computer Design Fundamentals”, Prentice-Hall, Second Edition, 2000.

Section(s) 04:

Instructor: Dr. Sadiq M. Sait
Office: 14/254
Tel: (3) 860 1099
Class Hours: U.T: 7:00 - 8:15 PM
Classroom: **22-130**
Office Hours: U.T.: 8:15 AM - 9:00 AM (or by e-mail appointment)
Email: sadiq@kfupm.edu.sa
WWW: <http://faculty.kfupm.edu.sa/coe/sadiq>

Grading Policies:

Quizzes and Homework, etc: 15%, First Major Exam: 20%, Second Major Exam: 30%, Final Exam: 35%

Tentative Exam Dates:

First Major Exam: On or around November 01, 2007.

Second Major Exam: On or around December 01, 2007.

Final Exam: As scheduled by the registrar.

Topics covered:

1. Introduction to Computer Organization

CPU, Memory, I/O devices, instruction execution and flow of information. Computer communication architectures.

2. Binary Systems

Binary numbers, Number base conversion, Complement, Signed binary numbers.

3. Boolean Algebra and Logic Gates

Axiomatic definitions of Boolean algebra, Basic theorems and properties of Boolean algebra, Boolean functions, Canonical and standard forms, Other logic operations, Digital logic gates.

4. Simplification of Boolean Functions

The map method, two-, three- and four-variable maps, Simplification into sum-of-products, NAND and NOR implementation. Other 2-level implementations. Don't-care conditions.

5. Combinational Logic

Introduction, Design procedure, Adders, Subtractors, Code conversion, Analysis procedure, EXOR and equivalence functions.

6. Combinational Logic with MSI and LSI

Introduction, Binary adders and subtractors, decimal adder, magnitude comparator, decoders and encoders. Multiplexers and ROMs, PLAs, PALs, FPGAs.

7. Synchronous Sequential Logic

Introduction, flip-flops, Triggering of flip-flops, Analysis of clocked sequential circuits, State assignment, Flip-flop excitation tables, Design procedure.

8. Registers, Counters and Register Transfer

Introduction, Registers, Shift and Multi-mode registers, Synchronous counters, Register transfer operations.

9. Introduction to machine-level Programming

Types of machine-level instructions, Macro-operations and programming in machine language.