# KING FAHD UNIVERSITY OF PETROLEUM & MINERALS
# COLLEGE OF COMPUTER SCIENCES & ENGINEERING

## *COMPUTER ENGINEERING DEPARTMENT*

# COE 200 Fundamentals of Computer Engineering
# Syllabus - Term 993

## 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)***

**Instructor** Dr. Aiman H. El-Maleh. Room: 22/332 Phone: 2811 Email: aimane@ccse

**Office Hours** Sat-Sun-Mon-Tues-Wed 11:30-12:00PM, 2:00-3:00PM

**Text Book:** *Logic and Computer Design Fundamentals*, Morris Mano and Charles Kime, Prentice-Hall, First Edition, 1997.

**Grading Policy:**

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|---|---|---|
| Laboratory | 20% | |
| Homework | 7% | |
| Quizzes | 8% | |
| Exam I | 15% | (tentative date: June 28 ) |
| Exam II | 20% | (tentative date: July 15) |
| Final | 30% | |

## Course Topics

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, XOR 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.
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.