# KING FAHD UNIVERSITY OF PETROLEUM & MINERALS
# COLLEGE OF COMPUTER SCIENCES & ENGINEERING
## COMPUTER ENGINEERING DEPARTMENT
## COE 200 Fundamentals of Computer Engineering
## Syllabus - Term 023

### 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. ***(Prerequisite: PHYS 102)***

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

**Office Hours** SMW 2:30-3:30 PM & UT 11:30-12:00 , and by appointment

**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 & Quizzes | 15% |
| Exam I | 20% |
| Exam II | 20% |
| Final | 25% |

### 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, Binar codes, Binary arithmetic.
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-, four-, five-, and six-variable maps, Simplification into sum-of-products, NAND and NOR implementation. Other 2-level implementations. Don't-care conditions. XOR and equivalence functions, Parity generation and checking
5. ***Combinational Logic:*** Introduction, Analysis procedure, Design procedure, Code conversion, Propagation delay and timing analysis.
6. ***Combinational Logic with MSI and LSI:*** Introduction, Decoders and Encoders, Multiplexers and Demultiplexers, Binary Adders and Subtractors, Decimal Aithmetic, Magnitude Comparator, Binary Multiplier, ALU design.
7. ***Synchronous Sequential Logic:*** Introduction, Latches, Flip-Flops, Triggering of flip-flops, Behavior and timing analysis of clocked sequential circuits, State assignment and reduction, Flip-Flop characteristic and excitation tables, Design procedure.
8. ***Registers, Counters and Register Transfer:*** Introduction, Registers, Shift and Multi-mode registers, Synchronous and Asynchronous counters, Register transfer operations.
9. ***Programmable Logic:*** ROMS, PLAs, PALs.