

**Summarized Course Description**

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| Course number: ECE 447     | Course name: Digital Integrated Circuits |
| لغة تدريس المقرر : English | Pre-requisites: ECE 343                  |
| Credit hours: 3 (3-0-0)    | Course level: Level – 8 or 9             |

**Course Description**

وصف المقرر :

MOS device models including Deep Sub-Micron effects; circuit design styles for logic, arithmetic and sequential blocks; estimation and minimization of energy consumption; interconnect models and parasitics; device sizing and logical effort; timing issues (clock skew and jitter) and active clock distribution techniques; memory architectures, testing of integrated circuits. Circuit layout and CAD tools.

**Course objectives**

أهداف المقرر :

1. Introduce the basics of digital integrated circuits design.
2. Exercise the different issues related to the development of digital integrated circuits including fabrication, circuit design, implementation methodologies, testing, design methodologies and tools and future trends.

**Course Outcomes**

مخرجات التعليم:

On successful completion this course, the student should be able to:

1. Understand CMOS circuits and systems that are suitable for CMOS fabrication.
2. Apply the models for state-of-the-art VLSI components, fabrication steps, hierarchical design flow.
3. Design simulated experiments using CAD verify the integrity of a CMOS circuit and its layout.
4. Practice the design aspects involved in the realization of CMOS integrated circuits/systems from device up to the subsystem level.

**Textbook and references**

الكتاب المقرر والمراجع المساندة:

Text Book: Sung-Mo (Steve) Kang, Yusuf Leblebici, and Chul Woo Kim. CMOS Digital Integrated Circuits Analysis & Design, 4th edition, McGraw Hill, 2014

Reference Text: Jan M. Rabaey, Anantha Chandrakasan, and Borivoje Nikolic. Digital Integrated Circuits, A Design Perspective, 2nd edition, Prentice Hall, 2003. ISBN: 0130909963

Palnitkar, Samir. *Verilog HDL: A Guide to Digital Design and Synthesis*. 2nd ed. Upper Saddle River, NJ: Prentice Hall, 2003. ISBN: 0130449113.

Jan M. Rabaey, Anantha Chandrakasan, and Borivoje Nikolic, Digital Integrated Circuits: A Design Perspective, 2nd Edition, Prentice Hall, ISBN: 0-13-090996-3, 2003.