

Syllabus

1. Course Description

- a. Title of a Course
MOS transistors
- b. Pre-requisites - none
- c. Course Type – elective (blended)
- d. Abstract

Learn how MOS transistors work, and how to model them. The understanding provided in this course is essential not only for device modelers, but also for designers of high-performance circuits.

The course is based on MOOC “MOS transistors” <https://www.coursera.org/learn/mosfet> (Platform - Coursera.org)

2. Learning Objectives

To familiarize students with the basic of MOS transistors

3. Learning Outcomes

- Know basic of MOS transistors
- Have skills in models for circuit simulation

4. Course Plan

1. Overview of the MOS Transistor
2. The Two-Terminal and Three-Terminal MOS Structures
3. The Long-Channel MOS Transistor
4. Small-Dimension Effects
5. Modeling for Circuits Simulation
6. Large-Signal Dynamic Operation
7. Small-Signal Modeling

5. Reading List

a. Required

1. Model and Design of Bipolar and MOS Current-Mode Logic. Massimo Alioto, Gaetano Palumbo (2005) <https://link.springer.com/book/10.1007/1-4020-2888-1>

b. Optional

2. Fundamentals of Bias Temperature Instability in MOS Transistors. Souvik Mahapatra (2016) <https://link.springer.com/book/10.1007/978-81-322-2508-9>
3. Matching Properties of Deep Sub-Micron MOS Transistors. Jeroen A. Croon, Willy Sansen (2005) <https://link.springer.com/book/10.1007/b105122>

6. Grading System

Cumulative grade = % online course *0,1

Final grade = 50% cumulative grade + 50% final exam

7. Guidelines for Knowledge Assessment

After completion of online course, students should pass the final exam.

8. Methods of Instruction

The discipline is delivered through online course

9. Special Equipment and Software Support (if required) - none