MOSCap Learning Materials

By completing the MOSCap Lab in ABACUS - Assembly of Basic Applications for Coordinated Understanding of Semiconductors, users will be able to a) understand the operation of a Metal-Oxide-Semiconductor using energy band diagrams, b) study the effects of interface traps, work function, oxide thickness, etc. on capacitance-voltage output, and c) understand MOS-C C-V characteristics in low and high frequency limits.

The specific objectives of the MOSCap Lab are:
Recommended Reading

Users who are new to the operation of MOS-Caps should consult the following resources:


**Demo**

* [MOSCap: First-Time User Guide](#)

* [MOSCap Demonstration: MOS Capacitor Simulation](#)

**Theoretical Descriptions**

* [Tutorial_PADRE_Simulation_Tools.pdf](#) (tutorial)

* [Illinois ECE 440 Solid State Electronic Devices, Lecture 31: MOS Capacitor](#)

* [Illinois ECE 440 Solid State Electronic Devices, Lecture 32: MOS Threshold Voltage](#)

* [Illinois ECE 440 Solid State Electronic Devices, Lecture 33: MOS Capacitance](#)

* [ECE 606 Lecture 32: MOS Electrostatics I](#)

* [ECE 606 Lecture 33: MOS Electrostatics II](#)
* ECE 606 Lecture 34: MOSCAP Frequency Response

* MOS Capacitors: Theory and Modeling

**Tool Verification**

* Verification of the Validity of the MOSCap Tool

**Examples**

* MOSCAP Worked out problems (Basic)

**Exercises and Homework Assignments**

1. Exercise for MOS Capacitors: CV curves and interface and Oxide Charges

2. Exercise: CV curves for MOS capacitors

**Solutions to Exercises**

Solutions are provided only to instructors!

**Evaluation**

* ABACUS: Test for MOSCAP Tool

**Challenge**

* MOSCAP CV profiling