<table>
<thead>
<tr>
<th>Course name</th>
<th>ECE 55900 MOS VLSI Design</th>
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<tbody>
<tr>
<td>Credit and contact hours</td>
<td>(3 cr.) Class 3</td>
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<tr>
<td>Course coordinator’s name</td>
<td>Lauren Christopher</td>
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**Course information**

2014-16 IUPUI Campus Bulletin description:
ECE 55900 MOS VLSI Design (3 cr.) P: ECE 30500 and ECE 36500 or Graduate Standing. Class 3. Introduction to most aspects of large-scale MOS integrated circuit design, including device fabrication and modeling; useful circuit building blocks; system considerations; and algorithms to accomplish common tasks. Most circuits discussed are treated in detail, with particular attention given those whose regular and/or expandable structures are primary candidates for integration. All circuits are digital and are considered in the context of the silicon-gate MOS enhancement-depletion technology. Homework requires the use of existing IC mask layout software; term projects assigned.

**Prerequisites/ Co-Requisite**
ECE 30500 or consent of instructor or graduate standing

**Required, Elective, or Selected Elective:**
EE Elective, CE Elective

**Goals for the course**
Upon successful completion of the course, students should be able to
1. An ability to analyze MOS circuits. [a, b, c, d]
2. An ability to synthesize MOS circuits. [c, e, k]
3. Experience in oral presentation, teamwork, and document preparation for a finished design. [b, c]
4. An ability to create and simulate a hierarchical digital design using commercial grade CAD software. [b, c, e, k]

**List of topics to be covered**
1-2: Introduction: Historical persp. & future trends; CMOS Process
3-4: MOS devices, SPICE models
5-7: Inverters
8-10: Designing combinational logic gates in CMOS
11-13: Designing sequential circuits
14-15: Interconnect and timing issues
16-17: Designing memory and array structures
18-20: Designing arithmetic building blocks
21-23: VLSI testing and verification
24-25: System design issues
26-27: Project Presentations
Midterm exams take two lectures

**Syllabi approved by**
Lauren Christopher

**Date of approval**
04/08/2016