Electrical and Computer Engineering 5470
VLSI Design
Elective

Course Description:
Introduces the standard cell library-based design flow in VLSI, including design methodology and IP design, CMOS circuit design styles, and design technology for low power and thermal aware designs.

Prerequisites:
ECE 5460/ECE 6460 or equivalent

Textbook:

Course Outcomes:
1. Understand CMOS transistor physical operation.
2. Design complex digital system using the ASIC standard cell library design flow.
3. Use CAD tools for synthesizing, floorplanning, placing and routing large integrated circuits.
4. Understand advanced issues of VLSI design including transistor scaling, timing, and process variation.

Topics Covered:
- CMOS Transistor Theory
- CMOS Scaling
- Process Variation
- Circuit Design Styles
- Noise Sources, Analysis
- Timing Verification
- Low Leakage Design
- Interconnect and Inductance
- Clocking, Synchronization and Metastability
- Packaging and Power Supply

Outcome Assessments (Grades):
Homework and Labs  30%
Midterm  25%
Final Project  40%
Class Participation  5%

Class Schedule:
Class Twice a week for one hour and fifteen minutes.

Contribution of course to meeting the requirements of Criterion 5:
3 credit hours of Engineering Topics and contains significant engineering design content
Relationship of course to student outcomes:
  b. An ability to design and conduct experiments, as well as to analyze and interpret data.
  c. An ability to design a system, component, or process to meet desired needs.
  e. An ability to identify, formulate, and solve engineering problems.
  k. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Instructor:
  Sanghamitra Roy, Assistant Professor
  January 2014