

**ECE 194BB (SPECIAL TOPICS)**  
**TOPIC: CMOS VLSI Design for Computer Engineering**  
**INSTRUCTOR: Luke Theogarajan**  
**ENROLLMENT CODE: 55079**  
**LOCATION: PSYCH 1902**  
**TIME: MW 6:30–8:20 P.M.**

**PREREQUISITE:** This is primarily geared for CE students but EE students are also welcome. Must have completed ECE 2ABC.

Introduction to the design and implementation of large-scale digital systems using CMOS VLSI: Basics of device and circuit level optimization of digital building blocks; MOS device models including Deep Sub-Micron effects; Circuit design styles for logic, arithmetic, and sequential blocks; Low-power design; Interconnect models and parasitics, device sizing and logical effort, timing issues (clock skew and jitter), and active clock distribution techniques; Memory architectures; technology and scaling; VLSI implementation styles– full custom to standard cell design; design flows and associated EDA tools; design verification; design for fabrication testing; hardware description languages (both analog & digital) (Verilog & AMS); power, area and delay optimizations; clocking schemes; clocked circuits such as domino; power distribution and dissipation; I/O and packaging. Extensive use of CAD tools The class requires the completion of a final project.