

# **ECE 225**

## **High-Speed Digital Integrated Circuit Design**

University of California, Santa Barbara  
Department of Electrical and Computer Engineering  
Winter 2021

### **Course Focus:**

- Nanometer scale issues in VLSI: Devices, Technologies, Circuits & CAD
- Emerging Technologies for VLSI

**Class Room/Schedule:** Online via Zoom

**Instructor:** Prof. Kaustav Banerjee, Room 4151, Harold Frank Hall  
Email: [kaustav@ece.ucsb.edu](mailto:kaustav@ece.ucsb.edu)  
URL: <http://nrl.ece.ucsb.edu/>

**Office Hours:** flexible, appointment by email.

**Text:** **The following books are recommended:**

1. *Fundamentals of Modern VLSI Devices*, Taur and Ning, Cambridge Univ. Press., 2<sup>nd</sup> edition, 2009.
2. *Design of High-Performance Microprocessor Circuits*, Chandrakasan, Bowhill, and Fox, IEEE Press, 2001.
3. *Emerging Nanoelectronics: Life With and After CMOS*, Eds. A. M. Ionescu and K. Banerjee, Springer, 2004.

**References:** To be posted on class website:  
[https://www.ece.ucsb.edu/courses/ECE225/225\\_W21Banerjee/](https://www.ece.ucsb.edu/courses/ECE225/225_W21Banerjee/)

**Software:** MMI: Max and Sue VLSI design tools, Avanti HSPICE, Mentor Graphics: XCallibre, and Model Sim Suites (available via [ECI account](#). Software manuals available on course website)

**Prerequisites:** ECE122A or equivalent is recommended

**Grading:** Assignments - 25%, Final Exam - 25%,  
Final project - 50% (must be attempted individually)

**Note:** Must complete all assignments and final project to pass.  
**Projects can be selected from a broad range of topics to be discussed in class.**