Instructor: Farhan Rana  
Office: PH323  
Email: fr37@cornell.edu

**Syllabus:**
This is a comprehensive undergraduate level course on microelectronics. Topics covered include:
- Basic semiconductor physics
- Electrons and holes in semiconductors
- Electrical transport in semiconductors
- PN junctions and diodes
- Photodiodes and Solar Cells
- MOS capacitors
- MOS field effect transistors
- Bipolar junction transistors
- Large signal and small signal models of electronic devices
- Single stage amplifiers, multistage amplifiers, differential amplifiers
- Analog circuit analysis and design
- High-frequency models of devices and high-frequency circuit analysis
- Digital logic and MOS logic devices,
- Complimentary MOS (or CMOS) logic gates
- Fundamental trade-offs in high speed analog and digital circuit design
Course Website and Homeworks

• All course documents, including:
  - Lecture notes
  - Homeworks and solutions
  - Exam solutions
  - Extra course related material
  - Labs

will appear on the course website:

https://courses.cit.cornell.edu/ece315/

Homeworks

• Homeworks will be due on Thursdays at 7:00 PM in course drop box in Phillips Hall

• New homeworks and old homework solutions will appear on the course website by Thursday night

• Homework 1 will be due next Thursday and will be available on the course website by tomorrow night

Course Grading and Textbooks

• Course grading will be done as follows:
  - Homeworks and Labs (35%)
  - Midterm (25%)
  - Final Exam (35%)
  - Instructor discretion (5%)

• No in-class quizzes, no pop-quizzes, no clickers,

• Midterm and the Final exam will both be comprehensive

Textbooks

• There are no required textbooks. Highly recommended textbooks are:
  - *Microelectronics: An Integrated Approach*
    by Howe and Sodini (out of Print)
  - *Microelectronic Devices and Circuits*
    by Clifton Fonstad (out of print)
Course Recitation Sections

There will be recitation sections on MW 7:30-9:00 PM in PH219 every week

**Goals:** Homeworks, discussions, problem solving, etc

Course Labs

There will be labs on MTWF 2:30-4:30 PM in PH237

There will be 4 labs total in the semester (Final lab will be an open ended design project)

**Make sure you are signed up for one lab slot**

Lab reports/writeups will be due the week following the lab

**Goals:** Characterize devices, build and test circuits

Labs are mandatory!

Course Staff

**PhD TA:** Robin Ying (Head TA)  
rcy22@cornell.edu

**PhD TA:** Shimin Huang  
sh2378@cornell.edu

**MEng TA:** Mihir Marathe  
mmm389@cornell.edu

**MEng TA:** Adarsh Jayakumar  
aj373@cornell.edu

**TA office hours and locations:** PH 429

- Tuesdays: 4:30-6:00 PM
- Thursdays 4:30-6:00 PM