

**ECE 217C Nanotechnology  
Spring 2003**

**Code 15840**

- Textbook:** *Book chapters and articles will be available in the copy center..*
- Prerequisites:** EECS 113A and Physics 51A
- Outline (tentative):**
- Week 1 – Introduction to nanoscale systems. Length, energy, and time scales
  - Week 2 – Top-down approach to nanolithography. Spatial resolution of optical, deep-ultraviolet, x-ray, electron beam, and ion beam lithography.
  - Week 3 – Single electron transistors, coulomb blockade effects in ultra-small metallic tunnel junctions.
  - Week 4 – Quantum confinement of electrons in semiconductor nanostructures: two-dimensional confinement (quantum wells). Band gap engineering. Epitaxy.
  - Week 5 – Landauer-Buttiker formalism for conduction in confined geometries.
  - Week 6 – One-dimensional confinement: quantum point contacts, quantum dots.
  - Week 7 – Bottom-up approach. Chemical self-assembly, carbon nanotubes.
  - Week 8 – Molecular electronics. Self-assembled monolayers. Electrochemical techniques; applications in biological and chemical detection.
  - Week 9 – Atomic scale characterization techniques: scanning tunneling microscopy, atomic force microscopy.
  - Week 10 – Introduction to quantum methods of information processing.
- Lecture Hours:** 2-3:20 pm M, W, ICF103
- Instructor:** Professor Peter Burke, Electrical Engineering and Computer Science  
2232 Engineering Gateway  
949-824-9326 [pburke@uci.edu](mailto:pburke@uci.edu)
- Instructor Office Hours:** 1 p.m. – 2 p.m., M, W
- Grading Components:**
- |                                   |     |
|-----------------------------------|-----|
| Midterm (Mon., May 5)             | 25% |
| Homework                          | 10% |
| Paper (due before the final exam) | 25% |
| Final Exam                        | 40% |
- Homework:** Homework assignments will be given throughout the quarter. Homework assignments are not collected or graded. However, if you do not do the HWs and understand the solutions you will probably not pass the course.

***Questions policy:***

There is no such thing as a dumb question. However, there is also a time and a place for everything, so...

The appropriate use of **email**, **lecture**, **discussion section**, **office hours** is as follows:

If you have questions about the **content** of the course or the homework problems, the appropriate venue is to ask questions during **lecture**, the **discussion sections**, or **office hours**. Emails regarding content will be ignored, because it is difficult to explain content related material by email. Questions during lecture are encouraged!

If you have questions about the **administration** of the course, the appropriate venue is to ask questions during the **lecture** if it concerns all students, or during **instructor office hours** if it concerns only you. If it concerns all students it is only fair that all students get to hear the answer during the lecture period!

If you have a question about what is going to be covered on the midterm or final, those questions will only be answered during the **lecture**, not by email or in office hours. No emails about the content of the midterm or final will be answered. The reason is that it is only fair for all the students to hear the answer to your question!