EEL4930/5930: Modeling and Simulation of Semiconductor Devices  Spring 2005

Instructor: Dr. Petru Andrei
  Lecture Hours: MWF 11:50am-12:40pm
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Prerequisites:
  Basic background in semiconductor physics and devices is beneficial, but not absolutely necessary.

References (no textbook required):

Office Hours:
  MW 1pm-2:30pm or by appointment.

Homework:
  Homework will be assigned periodically during the semester. Some homework requires the use of MATLAB or implementing some numerical algorithms in C.
  • EEL4930: (Undergraduate course) Cooperation is allowed, but the names should be listed on the cover. Each person should hand in separate sets of solutions.
  • EEL5930: (Graduate course) Graduate students should be able to solve all problems individually.

Presentations/projects:
  Each student will give at least one presentation:
  • EEL4930: (Undergraduate course) The presentation(s) will be related to one or two problems from the homework. The students registered for EEL4930 are not required to hand in their presentations.
  • EEL5930: (PhD course) The students registered for EEL5930 should write a 4-page paper and make a presentation on a topic announced early in the semester. Each student will be assigned a different topic. The final paper should be formatted as close as possible to the IEEE standard, which you can find at: http://www.ieee.org/portal/cms_docs/pubs/transactions/TRANS-JOUR.DOC and should contain an Abstract, Introduction, one or more Technical Sections, and Conclusions.

Exams and Grading
  There will be no midterms or final exam. The grade will be based on the homework assignments from the material covered in class, and on the individual presentations.
• Homework: 80%
• Presentation: 20%
• Attendance: 5% (bonus points)
Grading scale: A: >90%, B: 80-90%, C: 65-79%, D: 50-64%, F: <50%
These breakpoints may be lowered slightly depending on overall class performance.

Objectives and Outcomes:
This course is designed to give students in-depth knowledge in simulation of submicron semiconductor devices. The implementation of the semiconductor equations and their numerical implementation by using the finite difference method, the finite element method, and the finite box method will be explained. Upon completing this course the student should be able to:

• analyze discretization of one, two, or three dimension partial differential equations,
• analyze boundary conditions,
• analyze semiconductor device operation,
• design geometries and meshes for physical problems,
• implement numerically algorithms to solve simple problems and partial differential equations,
• develop computer tools to simulate semiconductor devices.

Policy Statements:
• Class attendance is mandatory. College and University rules allow only 3 unexcused absences for this course.
• Cellular phones and beepers must be turned off in the classroom.
• Coming in late or leaving early will be considered as absence of class.
• Students are bound by the honor code of their university. Violations of the honor code will be reported. Penalties include but are not limited to 1) failing grade on the assignment and 2) failing grade for the course.
• Students with disabilities who need academic accommodations should: (1) Register with and provide documentation to the Student Disability Resource Center (SDRC); and (2) Bring a letter to the instructor indicating the need for accommodations and the specific type. This should be done within the first week of class. This syllabus and other class materials are available in alternative format upon request.