1. Catalog Description – (3 credits) Using nanotechnology simulation tools to study nanoscale devices; band structure, transport; molecular transistors, nanowires, nanotransistors, and quantum dots.

2. Pre-requisites and Co-requisites – EEL 4351/EEL 5091 or EEL 4329/EEL 5400

3. Course Objectives - To develop an understanding of nanoscale electronic devices and to develop an in-depth understanding of semiconductor materials and nanostructures

4. Contribution of course to meeting the professional component (ABET only – undergraduate courses) - NA

5. Relationship of course to program outcomes: Skills student will develop in this course (ABET only undergraduate courses) - NA

6. Instructor – Dr. Jing Guo
   a. Office location: 551 NEB
   b. Telephone: 392-0940
   c. E-mail address: guoj@ufl.edu
   d. Class Web site:
   e. Office hours: TBD

7. Teaching Assistant -
   a. Office location:
   b. Telephone:
   c. E-mail address:
   d. Office hours:

8. Meeting Times – M W F, 7th period

9. Class/laboratory schedule - 3 class periods consisting of 50 minutes each

10. Meeting Location - 328 Benton

11. Material and Supply Fees - None

12. Textbooks and Software Required -
   a. Title: Nanoscale Transistors: Device Physics, Modeling & Simulation
   b. Author: M. Lundstrom and J. Guo
   c. Publication date and edition: Spring 2005
   d. ISBN number:

      a. Title: Quantum Transport: Atom to Transistor
      b. Author: S. Datta
c. Publication date and edition: Cambridge University Press, 2005
d. ISBN number:

13. Recommended Reading - None
   a. Title:
   b. Author:
   c. Publication date and edition:
   d. ISBN number:

14. Course Outline (provide topics covered by week or by class period) –

   Part 1: Quantum Transport: Atom to Transistor
   1. Basics of Schrödinger Equation (2 weeks)
   2. Self-Consistent Electrostatics (1 week)
   3. Calculation of Semiconductor Bandstructures (1 week)
   4. Simulation of Nanostructure Bandstructures (1 week)
   5. Nanoscale MOS Capacitors (1 week)

   Exam I

   Part 2: Based on Nanoscale Transistors: Device Physics, Modeling, and Simulation
   6. Nanoscale Si transistors (1 week)
   7. Scattering Theory for Nanotransistors (1 week)
   8. Device Physics of Carbon Nanotube Transistors (2 weeks)
   9. Molecular Conduction (1 week)
   10. Device Theory of Single Electron Transistors (1 week)
   11. Project presentation (1 week)

15. Attendance and Expectations - Cell phones and other electronic devices are to be silenced. No text messaging during class or exams.

   Requirements for class attendance and make-up exams, assignments, and other work are consistent with university policies that can be found at:
   https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx

16. Grading – 45% Exam I, 45% Project presentation, 10% Homework

17. Grading Scale (e.g., 90-100 A, 85-89 B+, 80-84 B, etc.) If grades are to be curved, so state. Values should not overlap and the full grade to percentage/points map must be included.
   A: 93-100
   A-: 90-92
   B+: 87-89
   B: 83-86
   B-: 80-82
   C+: 77-79
   C: 73-76
   C-: 70-72
D+: 67-69
D: 63-66
D-: 60-62
E: 0-59

“In order to graduate, graduate students must have an overall GPA and an upper-division GPA of 3.0 or better (B or better). Note: a B-average is equivalent to a GPA of 2.67, and therefore, it does not satisfy this graduation requirement. For more information on grades and grading policies, please visit: http://gradschool.ufl.edu/catalog/current-catalog/catalog-general-regulations.html#grades

18. Make-Up Exam Policy - If you have a University-approved excuse and arrange for it in advance, or in case of documented emergency, a make-up exam will be allowed and arrangements can be made for making up missed work. University attendance policies can be found at: https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx

Otherwise, make-up exams will be considered only in extraordinary cases, and must be taken before the scheduled exam. The student must submit a written petition to the instructor two weeks prior to the scheduled exam and the instructor must approve the petition.

19. Honesty Policy – All students admitted to the University of Florida have signed a statement of academic honesty committing themselves to be honest in all academic work and understanding that failure to comply with this commitment will result in disciplinary action. This statement is a reminder to uphold your obligation as a UF student and to be honest in all work submitted and exams taken in this course and all others.

“…failure to comply with this commitment will result in disciplinary action compliant with the UF Student Honor Code Procedures (http://www.dso.ufl.edu/sccr/procedures/honorcode.php)

20. Accommodation for Students with Disabilities – Students Requesting classroom accommodation must first register with the Dean of Students Office. That office will provide the student with documentation that he/she must provide to the course instructor when requesting accommodation.

21. UF Counseling Services – Resources are available on-campus for students having personal problems or lacking clear career and academic goals. The resources include:
   · UF Counseling & Wellness Center, 3190 Radio Rd, 392-1575, psychological and psychiatric services.
   · Career Resource Center, Reitz Union, 392-1601, career and job search services.
22. Software Use – All faculty, staff and student of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.