

## EEE 4420 – Introduction to Nanodevices

Catalog Description: (3cr) Physical principles of modern solid-state devices and their applications, quantum mechanics and fundamentals of nanoelectronics.

Prerequisites: EEE 3396C or permission of instructor

Textbooks: J. Singh, *Modern Physics for Engineers* (recommended) and instructor lecture notes

Course Objective: The main goal of this course is to teach engineering students the fundamentals of quantum mechanics useful for applications in nanoelectronics.

Professional Component: 3 credits of Engineering Science

Instructor: Prof. Ant Ural

NEB 555  
392-9753  
[antural@ece.ufl.edu](mailto:antural@ece.ufl.edu)

Teaching Assistant: n/a

Class Schedule:  
3 classes per week of 50 minutes each

Meeting Times: Tu 4/ Th 4-5

Meeting Location: BEN 328

Grading: Homework, Midterm exam, Final exam

Course outline:

### I) Introduction

Wave-particle duality, de Broglie's hypothesis

### II) Modern formulation of quantum mechanics

Schrodinger's equation (time dependent and time-independent), wavefunctions, wavepackets, uncertainty principle, expectation values, operators

### III) Particles in simple potentials

Free particle, particle in a box, square quantum well, tunneling phenomena

### IV) More advanced topics