ECE 598/PHYSICS 690—SPRING 2012
NANO-OPTICS

Classical and quantum optics of the near-field. Review of Maxwell's equations. Evanescent waves and radiation theory in the near field. Lorentz model and optics of metals. Green's functions and plane-wave decompositions. Diffraction from small holes and arrays of small holes. Scattering from point scatterers and spheres. Method of coupled dipoles. Surface plasmons and plasmon polaritons. Near-field microscopy. Coherence theory in the near-field. Review of field quantization. Spontaneous emission and Wigner-Weisskopf theory. Purcell effect. Fluorescence near surfaces. FRET. Casimir effect. The course is meant to be accessible to engineering and physics graduate students.

Prerequisites: electrodynamics and quantum mechanics at the level of the books by Griffiths.

Instructor:
John C. Schotland
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Textbook: *Principles of Nano-Optics* by Novotny and Hecht

Homework:
Problem sets will be assigned roughly every 2 weeks. You are permitted to work together on the problems. However, you must write up your solutions independently.

Final Grade:
Will be determined from an average of your scores on the problem sets.