

EE 6381 (Sec 001) NanoPhotonics: Principles, Applications and Advances

Fall 2009 Tu/Th 11:00am-12:20pm 109 NH

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Course Prerequisites: Semiconductor fundamentals

Required Readings/Materials (one of the following two books: Course reserve at SEL).

Photonic Crystals: Molding the Flow of Light, by John D. Joannopoulos, Rovert D. Meade, Joshua N. Winn
Nanophotonics, by Paras N. Prasad, Wiley 2004

References

There are multiple holdings of photonic crystal and nanophotonics related books in the SEL library.

Course Description: Introduction of nanophotonics, with focus on the basic material systems (self assembly quantum dots, nanoparticles, and photonic crystals) to devices applications (lasers, detectors, sensors) and to system integration (photonic integrated circuits and silicon photonics). This dynamic class will cover the hot topics related to nanophotonics and the latest research updates.

Course Learning Goals/Objectives: This advanced topical course shall introduce the basic principles, applications and latest advances in the area of nanophotonics. Student shall have a clear view about this excited new area and ready to contribute to the advances of photonic technology for a broad area of applications, from telecommunication/data communications to solid state display, energy and sensing technologies. Students shall have an opportunity to get the latest update on this new field from the seminars offered by the experts in this area.

Lecture Topics

1. Introduction
 - a. Photonics and Optoelectronics: why nano?
 - b. Nanophotonic overview.
2. Materials for Nanophotonics
 - a. Quantum effect for electronic confinement: quantum dots
 - b. Nanoparticles: from semiconductor to organic
 - c. Microcavity effect for photonic confinement: photonic crystals
3. Building Blocks for Nanophotonics
 - a. Nanolasers
 - b. Nanodetectors
 - c. Nanosensors
 - d. Nanachannels
4. System Integration for Nanophotonics
 - a. Photonic crystal nano-PIC
 - b. Silicon PIC
 - c. Other approaches

Project:

Students can either choose from a given topic or suggest a topic for instructor's approval. Each student is required to do an in-class presentation and write a report.

Grading:

Midterm exam: 30%

Final exam: 30%

Project: 40%

Grading Scale:

A ($\geq 85\%$); B ($\geq 70\%$ to $< 85\%$); C ($\geq 60\%$ to $< 70\%$); D ($\geq 50\%$ to $< 60\%$); F ($< 50\%$).

Class Attendance and Drop Policy: Attendance is required. Students are responsible for all materials covered in class. Drop policy: As per University guidelines. See the Registrar's Bulletin or the University Calendar in the front part of the UTA catalog for drop dates.

Academic Dishonesty

It is the philosophy of The University of Texas at Arlington that academic dishonesty is a completely unacceptable mode of conduct and will not be tolerated in any form. All persons involved in academic dishonesty will be disciplined in accordance with University regulations and procedures. Discipline may include suspension or expulsion from the University.

"Scholastic dishonesty includes but is not limited to cheating, plagiarism, collusion, and the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts." (Regents' Rules and Regulations, Part One, Chapter VI, Section 3, Subsection 3.2, Subdivision 3.22)

Americans With Disabilities Act

The University of Texas at Arlington is on record as being committed to both the spirit and letter of federal equal opportunity legislation; reference Public Law 93112 -- The Rehabilitation Act of 1973 as amended. With the passage of new federal legislation entitled Americans with Disabilities Act - (ADA), pursuant to section 504 of The Rehabilitation Act, there is renewed focus on providing this population with the same opportunities enjoyed by all citizens.

As a faculty member, I am required by law to provide "**reasonable accommodation**" to students with disabilities, so as not to discriminate on the basis of that disability. Student responsibility primarily rests with **informing faculty at the beginning of the semester and in providing authorized documentation through designated administrative channels.**

Student Support Services Available

The University of Texas at Arlington supports a variety of student success programs to help you connect with the University and achieve academic success. These programs include learning assistance, developmental education, advising and mentoring, admission and transition, and federally funded programs. Students requiring assistance academically, personally, or socially should contact the Office of Student Success Programs at 817-272-6107 for more information and appropriate referrals.