COURSE SYLLABUS

ECE 6515 Nanophotonics, Spring 2018

GT Shenzhen Program, M/W* 3:10 – 5:00 pm, January 7 – March 27

Instructor:	Prof. Wenshan Cai
Office hours:	Monday 5:10-5:40 pm and Wednesday 9:40-10:10 am, GT Shenzhen Campus, in Dr. Cai's office Additional office hours may be available by appointment. Please send me an email for appointment at least 24 hours in advance.
Contact:	Email: wcai@gatech.edu
Course webpage:	TBD

Course description:

ECE 6515 provides a comprehensive overview of the fundamental principles and primary applications of nanophotonics. Nanophotonics studies the behavior of light and its interactions with matter on the micro- or nano-scale. It is an interdisciplinary field of study that encompasses physics, electrical engineering, materials science, and nanotechnology.

This course deals with the basic concepts and recent development of nanophotonic materials, devices, and systems. Topics to be covered include fundamentals of electromagnetics, wave optics, quantum mechanics, nanofabrication and nanocharacterization techniques, as well as specific areas in nanophotonics such as silicon photonics, photonic crystals, plasmonics, and metamaterials, along with their diverse applications in optical circuits, imaging, signal processing, data storage, biomedical sensing, and energy harvesting.

Prerequisites:

It is assumed that you have basic understanding of electromagnetic waves and/or optics.

Text and references:

Primarily lecture notes developed by Dr. Cai. Lecture slides will be posted online prior to each class.

Other useful references (not required):

- Bahaa Saleh and Malvin Teich, Fundamentals of Photonics, Wiley-Interscience, 2007
- Lukas Novotny and Bert Hecht, Principles of Nano-Optics (2nd ed.), Cambridge University Press, 2012
- Stuart Lindsay, Introduction to Nanoscience, Oxford University Press, 2009
- Stefan Maier, Plasmonics: Fundamentals and Applications, Springer, 2007
- Wenshan Cai and Vladimir Shalaev, Optical Metamaterials: Fundamentals and Applications, Springer, 2009
- John Joannopoulos, Steven Johnson, Joshua Winn, and Robert Meade, Photonic Crystals: Molding the Flow of Light (2nd ed.), Princeton University Press, 2008.

Homework:

Five problem sets will be assigned, graded, and returned. You will have approximately 1.5 weeks to work on each homework assignment. Late homework will not be accepted. Problem

sets and solutions will be made available via the course website. Students are welcome to discuss homework with others, but all submitted work must be original.

Grading:

Homework, term paper, a midterm exam, a final exam, and instructor's discretion will be used to evaluate performance with the following weights:

5% × 5	+	20%	+	20%	+	30%	+	5%	=	100%
homework		term paper		midterm exam		final exam		instructor's discretion		total

Note:

1. The "Instructor's discretion" will be based on your class attendance, course engagement, etc.
2. If you are not able to attend class or finish assignments because of professional activities or personal issues, you should contact Dr. Cai in advance so that appropriate arrangement can be made.

Honor Code:

All students are expected to comply with the Georgia Tech Honor Code. The academic Honor Code is available on the web at http://www.honor.gatech.edu.

*Additional information regarding class schedule:

1. The course will have 21 class meetings, including the midterm exam. The final exam is scheduled for March 27.
2. In observance of the Chinese New Year (a.k.a. the Spring Festival), the GT-Shenzhen program in Spring 2019 will have a holiday break from Feb. 2 to Feb. 11.
3. To recuperate the lost class hours, ECE 6515 will have two additional class meetings on Fridays, Feb. 1 and Feb. 15.
4. The class schedule described here is tentative and is subject to change due to unforeseen circumstances and/or program needs.