COURSE SYLLABUS

ECE 4500 Optical Engineering (Section A, 3 credit hours), Fall 2026

Instructor:	Prof. Wenshan Cai
Class meetings:	Time for in-person class meetings: MWF 9:30 – 10:20 am, Van Leer C456
Office hours:	Monday 3:30-4:30 pm. Pettit MiRC 213 Additional office hours may be available by appointment only. Please send me an email for appointment at least 24 hours in advance.
Email:	wcai@gatech.edu
Course web site:	Canvas course site ECE-4500

Course Description:

ECE 4500 presents the laws and applications of optics. This course covers nature of light, geometrical optics, wave optics, polarization, interference, diffraction, imaging, waveguides, optical instruments, introduction to lasers, and photonics in everyday life.

Course Learning Outcomes:

- Design and implement optical components and imaging systems using geometrical optics.
- Describe and analyze modern photonic systems for display, data storage, communication, and illumination.
- Design and characterize optical sources, including fluorescence, light emitting diodes, lasers, etc.
- Analyze light waves and their characteristics such as optical interference, diffraction, polarization, etc.
- Analyze and implement optical waveguides used in fiber communications and integrated photonics.

Prerequisites:

It is assumed that you are acquainted with calculus (MATH 2401 or equivalent), and have basic understanding of electromagnetic waves (ECE 3025 or equivalent).

Required Course Materials:

Primarily online notes.

Pedrotti[3], *Introduction to Optics* (3rd edition), Prentice Hall, 2006. (re-issued from Cambridge University Press, 2017)

Homework:

Eight problem sets will be assigned, graded, and returned. Homework is typically assigned on Wednesday and collected the following Wednesday at the beginning of class. 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 Policy and Weighting:

Homework, two in-class midterm exams and a final exam will be used to evaluate performance with the following weights:

3% × 8	+	20% × 2	+	30%	+	6%	=	100%
Homework		midterm exams		final exam		instructor's discretion		total

Note: The "Instructor's discretion" will be based on your class attendance, course engagement, etc.

Attendance Policy:

Class attendance is expected and constitutes up to 6% of the overall course grade.

Academic Integrity:

Georgia Tech aims to cultivate a community based on trust, academic integrity, and honor. Students are expected to act according to the highest ethical standards. Review Georgia Tech's Honor Code and the student Code of Conduct at:

https://catalog.gatech.edu/policies/honor-code/

https://catalog.gatech.edu/rules/18/

Accommodations for Students with Disabilities:

If you are a student with learning needs that require special accommodation, contact the Office of Disability Services (404-894-2563) as soon as possible to make an appointment to discuss your special needs and to obtain an accommodations letter. Please also e-mail me as soon as possible in order to set up a time to discuss your learning needs.

Student-Faculty Expectations Agreement:

At Georgia Tech, we believe that it is important to strive for an atmosphere of mutual respect, acknowledgement, and responsibility between faculty members and the student body. The Student-Faculty Expectations (http://www.catalog.gatech.edu/rules/22/) articulate some basic expectations that you can have of me and that I have of you. In the end, simple respect for knowledge, hard work, and cordial interactions will help build the environment we seek. Therefore, I encourage you to remain committed to the ideals of Georgia Tech while in this class.