PEP 579 A Nonlinear Optics

Department of Physics and Engineering Physics
Stevens Institute of Technology
Semester: Spring 2018

Schedule:
Monday 6:15 – 8:45 pm

Instructor: Prof. Yuping Huang

Email: yuping.huang@stevens.edu
Office: Burchard 618
Office Hours: Tuesday 11:00 am – Noon and by appointment.

Textbook(s) or References

Textbook 1: R. W. Boyd, Nonlinear Optics, Academic Press, 3rd Edition

Textbook 2: G. Agrawal, Nonlinear Fiber Optics, Academic Press; 5th edition

Catalog Description:

This course is dedicated to give students a working knowledge of the fundamental concepts and modern applications of nonlinear optics in optical communications, lasers, optical metrology, and quantum computing. Through this course, students will gain in-depth understanding and master mathematical tools for modeling nonlinear optical susceptibilities, wave propagation and coupling in nonlinear media, harmonic, sum, and difference frequency generation, parametric amplification and oscillation, phase-conjugation via four-wave mixing, self-phase modulation, and solitons.

Course Objectives:

The objective is to give students a working knowledge of the fundamental concepts and modern applications of nonlinear optics. Nonlinear optics is essential to classical and quantum optical technology. This course will cover the origin and mathematical description of nonlinear optics, as well as its important applications in optical communications, optical metrology, quantum computing, and so on.

List of Course Outcomes:

Through this course, students will gain in-depth understanding and master mathematical tools for modeling nonlinear optical susceptibilities, wave propagation and coupling in nonlinear media, harmonic, sum, and difference frequency generation, parametric amplification and oscillation, phase-conjugation via four-wave mixing, self-phase modulation and solitons. In addition, students will be exposed to the most recent development in classical and quantum information processing using optical signals.

Grading Procedure

Grades are calculated from a weighted average of homework and exams. The various components of your lecture grade have the following weights:

Final Exam…….……20%
Homework……..……..…….....40%
Project …….……..…….20%
Attendance and/or in-lecture pop quizzes……...20%

Final letter grades will be calculated using the following distribution:

Letter Grade:	% Grade:
A	90-100%
A-	85-89.9%
B+/B/B-	70-84.9%
C+/C/C-	55-69.9%
D+/D	45-54.9%
F	<45%

In-lecture Pop Quizzes and Attendance Counting : Depending on the attendance and course progress, there might be unannounced in-class pop quizzes and/or attendance counting.

Lecture notes: Lecture notes for each chapter will handed out ***after*** the completion of that chapter.