

## Optics II Course Number: 4680/6680

Credit: 3 credits

Course Fee: None

Room: SER122

Time of class: 1:30 pm – 2:45 pm, Tuesday and Thursday weekly basis

Instructor: Titus Yuan, Phone #: 797-2959, email: [titus.yuan@usu.edu](mailto:titus.yuan@usu.edu), Office: SER318D

Course description:

This class is built upon the OPTICS I, which describes the basic characteristics of light and geometric optics, to focus more on the applications of optics. The class will cover some important concepts, such as polarization, interference and diffraction of light. In addition, the class will introduce the basic principles of laser. The textbook is OPTICS 5<sup>th</sup> edition by Eugene Hecht.

Goals and expectation:

The expectation is that students would gain knowledge on the aforementioned concepts and understand how some of the optical component and instruments work, such as the polarizers, wave plates, laser and interferometer.

Course schedule:

Below is the proposed schedule. Please be aware that this list intends to show the estimated schedule and materials. Since the course is going to cover lots of ground within one semester, we may not be able to discuss every item in the list, and the schedule could be changed slightly.

1/8 – 1/10 The superposition of waves (Chapter 7.1-7.4)

1/15 – 1/17 Polarization (Chapter 8.1 – Chapter 8.4)

1/22 – 1/24 Polarization (continue, Chapter 8.5-8.10)

1/29 – 1/31 Interference (Chapter 9.1-9.2)

Mid-term exam will be held in the 1/29 class or the class in the first week of February.

2/5 – 2/7 Interference (continue, Chapter 9.3-9.6)

2/12 – 2/14 Interference (continue, Chapter 9.7-9.8)

2/19 – 2/21 Diffraction (Chapter 10.1-10.3)

2/26 – 2/28 Fourier Optics (Chapter 11)

Mid-term exam will be held in class during the first week of March

3/5 – 3/7	Introduction of Laser
3/12 – 3/14	Modes and black body radiation
3/19 – 3/21	Line-broadening mechanisms
3/26 – 3/28	Energy level and population inversion
4/2 – 4/4	Laser resonator and cavity
4/9 – 4/11	Gaussian beam and Properties of laser beam
4/16 – 4/18	Q-switch and Mode locking laser
4/23	Review
4/25	Final exam

Grade:

50% homework; 50% exams (two mid-term exams and one final exam). Homework will be handed out on weekly basis and due on each Tuesday, unless further noticed.

Note:

For Graduate students, this is not a core class and must be put on your plan of study with approval from your committee in order for tuition waiving. As prerequisite classes, the student should have taken Physics for Science and Engineer I, II, E&M I and Optics I.

**The Honor Code Statement:** The honor code will be strictly enforced in this course. Any suspected violations of the honor code will be promptly reported to the honor system. For more information please visit: <http://www.usu.edu/policies/PDF/Acad-Integrity.pdf>

**The Disability Resource Center Statement:** USU welcomes students with disabilities. If you have, or suspect you may have, a physical, mental health, or learning disability that may require accommodations in this course, please contact the Disability Resource Center (DRC) as early in the semester as possible (University Inn # 101, 435-797-2444, [drc@usu.edu](mailto:drc@usu.edu)). All disability related accommodations must be approved by the DRC. Once approved, the DRC will coordinate with faculty to provide accommodations.