Physics Department

Physics 335 Optics

Winter 20/21

**Instructor:** Dr. Wael I. Karain. Office: SCI202

**Prerequisites:** Phys 231; Math 2311

**Time & Room**: *TR 10-11:15 Sci021; Online via ITC*

**Textbook:** J. Peatross and M. Ware, Physics of Light and Optics, 2015 edition. The book is available online at: https://optics.byu.edu/docs/OpticsBook.pdf

**Course Description**: This is a senior-level course in optics. We will study electromagnetic waves, matrix methods in geometrical optics, reflection, refraction, diffusion, interference, diffraction, polarization, Fourier optics, and an introduction to the physics of lasers. Some of these topics will be covered using rigorous Math, while others will be covered qualitatively.

**Course lectures**: The course will be offered as two 75 minute lectures per week.

**Course Topics**: All or parts of these chapters will be covered.

Chapter 2: Plane Waves and Refractive Index.

Chapter 3: Reflection and Refraction.

Chapter 4: Multiple Parallel Interfaces

Chapter 6: Polarization of Light.

Chapter 7: Superposition of Quasi-Parallel Plane Waves

Chapter 8: Coherence Theory

Chapter 9: Light as Rays

Chapter 10: Diffraction.

Chapter 11: Diffraction Applications

Chapter 12: Interferograms and Holography.

Chapter 13: Blackbody Radiation.

**Course objectives:**

After you pass this course, you will be able to:

1. Relate optics to electromagnetism.
2. Understand and be able to describe important optical phenomena both qualitatively, and quantitatively.
3. Connect theory in optics to important optical applications.

**Homework Policy:**  Problems on topics covered in class will be assigned during the semester. It is very important that you try to solve the problems on your own.

**Classwork Policy:** During lectures, I will give you simple problems to solve via ITC. These problems can be from material covered in that lecture, or previous lectures.

**Course Evaluation and Grading**

Midterm 25%

Homework and Classwork 25%

Short research paper 15% (Topics will be announced during the semester).

Final Exam 35%

**Deadline Policy**: It is important that we learn to respect deadlines. Late work will receive partial, or no credit at all.

**Academic Honesty**: Cheating in any form will not be tolerated.