

Principles of Optics (Ve334) Syllabus for Fall 2020

Jigang Wu

Course description:

This course introduces basic principles of optics. Topics include light sources and propagation of light; geometrical optics, lenses and imaging; ray tracing and lens aberrations; interference of light waves, coherent and incoherent light beams; Fresnel and Fraunhofer diffraction; and other selected topics on modern optics.

Class schedule and location:

Class schedule: Monday 10:00-11:40
 Wednesday 10:00-11:40
 Friday (odd weeks) 12:10-13:50

Classroom: Dong Zhong Yuan 1-201

Instructor information:

Jigang Wu: jigang.wu@sjtu.edu.cn, Rm. 424

TA information:

TBD

Grading policy:

- Weekly homework: 40%.
- Attendance: 10%.
- Midterm exam: 20%.
- Final exam: 30%.

Late policy for homework:

- 20% off every day. Real Score = Score * (1 - 20% * day);

Course schedule:

Week	Lecture	Reading	HWK	Due
1	09/07 - The nature of light, basics of geometrical optics 09/09 - Geometrical optics: image formation 09/11 - Geometrical optics: stops, mirrors	Chap. 1, 5		
2	09/14 - Geometrical optics: prisms 09/16 - Geometrical optics: ray tracing	Chap. 5, 6	Hwk #1	
3	09/21 - Geometrical optics: aberrations 09/23 - Geometrical optics: GRIN lens, human eye 09/25 - Geometrical optics: microscope, camera	Chap. 5, 6	Hwk #2	Hwk #1
4	09/28 - Wave motion 09/30 - Electromagnetic waves	Chap. 2, 3	Hwk #3	Hwk #2

5	10/05 - National holiday 10/07 - National holiday 10/09 - Optical material dispersion	Chap. 3		
6	10/12 - Reflection and refraction 10/14 - Total internal reflection	Chap. 4	Hwk #4	Hwk #3
7	10/19 - Superposition of waves 10/21 - Coherence 10/23 - Polarization	Chap. 7, 8	Hwk #5	Hwk #4
8	10/26 - Midterm exam 10/28 - Birefringence, anisotropic media	Chap. 8		
9	11/02 - Waveplates 11/04 - Optical activity 11/06 - Liquid crystals	Chap. 8	Hwk #6	Hwk #5
10	11/09 - Interference: general considerations 11/11 - Wavefront-splitting interferometers	Chap. 9	Hwk #7	Hwk #6
11	11/16 - Amplitude-splitting interferometers 11/18 - Michelson interferometers 11/20 - Multiple-beam interference	Chap. 9	Hwk #8	Hwk #7
12	11/23 - Diffraction: Huygen's principle 11/25 - Fraunhofer diffraction	Chap. 10	Hwk #9	Hwk #8
13	11/30 - Fresnel diffraction, zone plates 12/02 - Diffraction gratings, holography 12/04 - Selected topics on modern optics	Chap. 10, 11, 13		Hwk #9
14	Date TBD - Final exam			

Textbook: E. Hecht, Optics, 4th ed.