	Introduction to Modern Optics-E2			BEAUCAMP Anthony Tadeus Herve
< >	Introduction to Modern Optics-E2			

		( )	( )	
	B	2	1	
	2024	4		

[   ]

Optics is a very practical field of physics that has enabled the fabrication of instruments and devices in almost every other areas of science and technology, including chemistry, biology, geology, etc...
Students will learn the fundamental properties and behavior of light, and its interaction with matters (refraction, dispersion, diffraction, polarization...). The theory of geometric and wave optics will be taught, and their use in designing high performance optical assemblies from digital cameras to space telescopes.

[   ]

- Grasp the importance of optics in enabling modern science and technology.
- Understand the various aspects of light propagation in a vacuum and substance.
- Use this knowledge to solve optical design problems using state-of-the-art optical design software.

[   ]

1. A brief history of optics and the nature of light [1 week].
2. Basic of optics: Wavefronts, Fermat's principle, Snell's law [1 week].
3. Geometric optics: Ray transfer matrices, thin vs. thick lenses [2 weeks].
4. Imaging systems: Aperture/field stops, pupils, field of view [2 weeks].
5. Optical aberrations: Chromatic and geometric aberrations [2 weeks].
6. Wave optics 1: Huygens-Fresnel principle, interferometers [2 weeks].
7. Wave optics 2: Fraunhofer diffraction, point spread function [2weeks].
8. The Optical Software for Layout and Optimization (OSLO):
- Learn how to layout optical systems [1 week].
- Learn how to optimize the performance of optical systems [1 week].

Final examination [1 week].
Feedback session [1 week].

[   ]

[   ]

Evaluation will be based on:
- Class Participation (10%): Student participation will be asked in solving problems and discussing theories and their application.
- Homework (20%): Typical problems will be assigned, which you can solve by applying the laws and methods learnt during lectures (every 2 weeks).
- Quizzes (20%): Mini-exams, to check that you remember important laws and principles from previous lectures and study guides (every 4 weeks).
- Final examination (50%): You will be tested with a series of problems that combine previously studied cases and original cases.

Introduction to Modern Optics-E2(2)

[   ]

Eugene Hecht   Optics (4th Edition)   ISBN:129-202-157-8   Amazon link: http://www.amazon.co.jp/ Optics-Eugene-Hecht/dp/1292021578/

[   ]

[   ]

Personal study using book by Hecht (10~15 pages per week).

[   ]

Questions can be sent by email, and will be answered either electronically or by appointment (depending on the case).