

科目ナンバリング											
授業科目名 <英訳>		Introduction to Modern Optics-E2 Introduction to Modern Optics-E2				担当者所属 職名・氏名		工学研究科 特定准教授 BEAUCAMP, Anthony Tadeus Herve			
群	自然科学科目群			分野(分類)	物理学(基礎)			使用言語	英語		
旧群	B群	単位数	2単位	週コマ数	1コマ	授業形態	講義 (対面授業科目)				
開講年度・ 開講期	2024・前期		曜時限	月4		配当学年	主として1・2回生	対象学生	理系向		
[授業の概要・目的]											
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.											
[到達目標]											
- 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.											
[授業計画と内容]											
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].											
[履修要件]											
特になし											
[成績評価の方法・観点]											
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.											
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Introduction to Modern Optics-E2(2)

[教科書]

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

[参考書等]

(参考書)
授業中に紹介する

[授業外学修 (予習・復習) 等]

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

[その他 (オフィスアワー等)]

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