電気通信大学　平成20年度シラバス

授業科目名	Introduction to Modern Optics and Photonics		
英文授業科目名	Introduction to Modern Optics and Photonics		
開講年度	2008年度	開講年次	３、４年次
開講学期	後学期	開講コース・課程	昼間コース
授業の方法	講義	単位数	2
科目区分	総合文化科目-国際科目-		
開講学科・専攻	情報通信工学科 情報工学科 電子工学科 量子・物質工学科 知能機械工学科 システム工学科 人間コミュニケーション学科		
担当教官名	富田　康生		
居室	西2-317		

公開E-Mail	授業関連Webページ
ytomita@ee.uec.ac.jp	http://talbot.ee.uec.ac.jp/optics.html

【主題および達成目標】

This is an introductory-level course in the ever-increasing field of modern optics. It includes ray- and wave-descriptions of light propagation and image formation with coherent light. An introduction to holography and optical information processing is also given as an example of parallel and multi-dimensional data handling capabilities of light. Furthermore, it contains discussions of photonic devices (such as lasers, amplifiers, light modulators and detectors) and fiber-optic communications systems.

【前もって履修しておくべき科目】

Electromagnetism (undergraduate level)

【前もって履修しておくことが望ましい科目】

Fourier analysis

【教科書等】

• Texts and references: The following book will be used as a textbook:
－ F.Graham Smith and Terry A. King, Optics and Photonics, Wiley, New York, 2000.
Instructor ’ s notes will also be provided if necessary. And materials will be taken from the following optional textbooks as well:
－ E. Hecht, Optics, 4th edition, Addison-Wesley, San Francisco, 2002
－ A.Yariv, Optical Electronics in Modern Communications, Oxford Univ. Press, Oxford, 1997.
－ B.E.A. Saleh and M.C. Teich, Fundamentals of Photonics, Wiley, New York, 1991.

【授業内容とその進め方】

Topics in 90-minute lectures will include:
1. Preliminaries (Concept of waves and their mathematical expressions)
2. Wave optics
3. Fourier optics
4. Electromagnetic and crystal optics
5. Guided-wave and fiber optics
6. Introduction to fiber-optic communications

* Students are expected to read assigned pages (shown on the web site) as a reading assignment prior to the class. Also, a homework assignment will be given on the web site after the class, which must be handed in at the beginning of the next class. The solution set will be available on the web site after the submission so that students may check their answers. Scored results will be returned one week after the submission.

【成績評価方法及び評価基準(最低達成基準を含む)】

The grades will be based 20% on the homework, 30% on the mid-term exam and 50% on the final exam.
Students are expected to learn the following things:
1. Basic properties of optical waves and their mathematical expressions
2. Wave propagation characteristics in isotropic and anisotropic media
3. Wave polarization and its applications
4. Basic understanding of Fourier optics
5. Fundamentals of fiber optic communications

【オフィスアワー：授業相談】

Monday: 16:00-17:00

【学生へのメッセージ】

Learn how to practically use the concept of optics and photonics.

【その他】