

3. 電気電子情報工学系 Electrical, Electronics and Computer Engineering Field			EEC-S1
授業科目名 Course Title	電子物性工学 Electric Physics and Engineering	単位数 Credit	2
担当教員 Instructor	YAMAMOTO Kohji, SUEMITSU Tetsuya, KAWATO Sakae, NAKAO Akira 山本 晃司、末光哲也、川戸 栄、中尾 慧	開講学期 Semester	春学期 SPRING SEMESTER
キーワード Keywords	Crystal structure, Semiconductors, Electron devices, Absorption, Amplification, Laser, Optical waveguide	曜日/時限 Day & Time	

授業概要 Course summary	
結晶格子、半導体と電子デバイス、レーザー、光導波路を理解する。 This course deals with crystal lattices, semiconductors and electron devices, laser, and optical waveguides.	
到達目標 Course goal	
To understand crystal lattices, semiconductors and electron devices, laser oscillation, and optical waveguides.	
授業内容 Course description	
1. Unit cell and symmetry operation 2. 2-Dimensional lattice (nets) 3. 3-Dimensional lattice (Bravais lattice) 4. Crystal system 5. Basis of semiconductors 6. Valence bonds and energy bands 7. Impurity doping in semiconductors 8. Building blocks of electron devices 9. Study the absorption and emission of light 10. Interaction between light and matter in thermal equilibrium 11. Laser gain media and light amplification in three- and four-level systems 12. Laser oscillation 13. Structure and types of optical waveguides 14. Optical fiber 15. Applications of optical waveguides	
準備学習（予習・復習）等 Preparation / Review	
Those who take this course must have in-depth understanding mathematic calculations, wave equations, electromagnetics, and waveguides.	
授業形式 Class style	
ゼミナール方式 Seminar	

成績評価の方法・基準 Method of evaluation
レポート、テスト Report and Examination
教科書・参考書等 Textbook and material
Photonics, Amnon Yariv, Pochi Yeh, Oxford University Press Semiconductor Devices: Physics and Technology, Simon Sze and M.-K. Lee, Wiley
受講要件・予備知識 Prerequisite
ベクトル解析、電磁気学、電磁波工学 vector analysis, electromagnetism, electromagnetic wave engineering
その他の注意事項 Note