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, SHIOJIMA Kenji, KAWATO Sakae, IMABAYASHI Hiroki 山本 晃司、塩島 謙次、 川戸 栄、今林 弘毅	開講学期 Semester	春学期 SPRING SEMESTER
キーワード Keywords	Crystal structure, Metal/semiconductor interfaces, Absorption, Amplification, Laser, Crystal growth, Semiconductor materials	曜日/時限 Day & Time	

授業概要　Course summary

結晶格子、金属-半導体界面、電磁波（光）の吸収と増幅、半導体デバイスを理解する。

This course deals with crystal lattices, metal/semiconductor interfaces, absorption and amplification of electromagnetic waves (light), and semiconductor devices.

到達目標　Course goal

To understand crystal properties in solid, electrical properties of metal/semiconductor interfaces, absorption and amplification of electromagnetic waves (light), and semiconductor materials.

授業内容　Course description

1. Unit cell and symmetry operation
2. 2-Dimensinal lattice (nets)
3. 3-Dimensinal lattice (Bravais lattice)
4. Crystal system
5. Basic models of metal/semiconductor interfaces
6. Electrical properties of metal/semiconductor interfaces
7. Fabrication process of metal/semiconductor interfaces
8. Characterization techniques of metal/semiconductor interfaces
9. Interaction of radiation and atomic systems
10. Induced transitions
11. Rate equations
12. Laser efficiency
13. Materials for semiconductor devices
14. Growth technology of semiconductor crystals
15. Applications of semiconductor thin films

準備学習（予習・復習）等　Preparation / Review

Those who take this course must have in-depth understanding mathematic calculations, energy band diagrams, wave equations, electromagnetics.

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	
受講要件・予備知識　Prerequisite	
ベクトル解析、半導体工学、電磁気学、電磁波工学 vector analysis, semiconductor engineering, electromagnetism, electromagnetic wave engineering	
その他の注意事項　Note	