3．電気電子情報工学系　Electrical, Electronics and Computer Engineering Field			**EEC-F3**
授業科目名 Course Title	電気物性工学 Electrics Engineering	単位数 Credit	**2**
担当教員 Instructor	YAMAMOTO Kohji, SHIOJIMA Kenji, KAWATO Sakae, MAKINO Takayuki, ASUBAR JOEL TACLA, IMABAYASHI Hiroki NAKAO Akira 山本　晃司、塩島　謙次、川戸　栄、牧野　哲征、アスバル　ジョエル タクラ、今林　弘毅、中尾　慧	開講学期 Semester	秋学期 AUTUMN SEMESTER
キーワード Keywords	Crystal structure, semiconductor, electromagnetic waves	曜日/時限 Day & Time	開講予定なし Not offered

授業概要　Course summary

結晶格子、金属-半導体界面、磁性とスピントロニクス、物質中の電磁波（光）の伝搬、半導体デバイス、半導体キャリア輸送、光導波路を理解する。

This course deals with crystal lattices, metal/semiconductor interfaces, magnetism and spintronics, absorption and amplification of electromagnetic waves (light), semiconductor devices, thermodynamics carrier transport in semiconductors, and optical waveguides.

到達目標　Course goal

To understand crystal lattices, metal/semiconductor interfaces, magnetism and spintronics, absorption and amplification of electromagnetic waves (light), semiconductor devices, thermodynamics carrier transport in semiconductors, and optical waveguides.

授業内容　Course description

1. Symmetry operation
2. Lattice
3. Electrical properties of metal/semiconductor interfaces
4. Characterization techniques of metal/semiconductor interfaces
5. Basis of magnetism
6. Spintronics
7. Mathematics of electromagnetic waves
8. Dispersion and group velocity
9. Thermodynamics
10. Statistical mechanics
11. Intrinsic Semiconductor: crystal structures, properties and energy band diagram
12. PN junction: physics and energy band diagram
13. Applications of semiconductor thin films
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, 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