

Photonic Device

2 units (selection)

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Target) To understand the principle of the current optoelectronic devices, e.g., Light Emitting Diodes, Laser Diodes and so on. To develop ability to solve various problems in optical device application.

Outline) This course will cover topics on current optical and optoelectronic devices. Topics treated include Light Emitting Diode, Laser Diode, Solar Cell, Optical Modulator and Nonlinear Optical Devices.

Style) Lecture

Keyword) *optoelectronic device, optical device, light emitting diode, laser diode, optical modulator, Solar cell*

Relational Lecture) “**Optical properties of materials**”(0.5), “**Lecture in Optical Materials and Devices, Part 1**”(0.5)

Requirement) Students should have fundamental knowledges about semiconductor physics and devices for undergraduate students.

Notice) 授業を受ける際には、2時間の授業時間毎に2時間の予習と2時間の復習をしたうえで授業を受けることが、授業の理解と単位取得のために必要である。

Goal)

1. Students can explain the principle and structures for light emitting devices.
2. Students can explain the principle and structures for photodetector and solar cell.
3. Students can explain the principle of light modulators.
4. Students can explain the principle of nonlinear optical devices.

Schedule)

1. Introduction
2. Interaction between Light and dielectric materials
3. Semiconductors and other optical materials
4. Optical properties of semiconductors
5. Semiconductor PN-junction
6. Light Emitting Diode
7. Application of Light Emitting Diode
8. Laser Diode
9. Application of Laser Diode
10. Photoconductor Cells

11. pin photodiode

12. Solar cell and amorphous-semiconductor optoelectronic devices

13. Optical Modulator

14. Nonlinear optical devices

15. Integrated Optical Devices

16. Final Examination

Evaluation Criteria) Activity: 20%, Reports: 40% and Final Exam.:40%

Textbook) 中澤, 鎌田著, 光物性・デバイス工学の基礎, 培風館 1999

Contents) <http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=216857>

Contact)

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