

Optical Information and Communication Engineering

Special Subjects
Elective 2 credit

MURO KOICHI

1. Course Description

The aim of the class is to learn the basics of optical information and communication engineering and to have advanced expertise. To be able to acquire research and research abilities as a master's degree and lead research and development from a broad perspective. Students will report the relationship optical information and communication engineering and their research themes.

2. Course Objectives

1. Students can description an overview of optical information and communication engineering.
2. Students can explain the fiber optics are used for long-distance, high-capacity transmission.
3. Students can explain the relationship between optical information and communication engineering and their research themes.

3. Grading Policy

Explanation of English materials used in class (50%) and report on optical information and communication engineering and technology related to student research themes (50%).
Students get feedback and advice from a technical and industrial perspective on the materials and data used in the course.

4. Textbook and Reference

Textbook

Reference will be posted on the course website.

5. Requirements(Assignments)

Carefully read the corresponding parts of the lecture material and reference book. (~1 hour)
Investigate the relationship with the student's research theme and summarize it in a report format. (~2 hours)

6. Note

In order to confirm the degree of understanding, we may impose a small problem in the publication of materials.

7. Schedule

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| [1] | Guidance and Overview of optical information and communication engineering. |
| [2] | Components of optical information and communication technology : Laser diode, optical fiber. |
| [3] | Optical fiber input / output : Reflection and refraction of light. |
| [4] | Light wave propagation 1 : Interference, coherent light. |
| [5] | Light wave propagation 2 : Phase and group velocity. |
| [6] | Light wave control : Polarization and extinction ratio. |
| [7] | Light wave propagation by optical fiber 1 : Multi-mode optical fiber. |
| [8] | Light wave propagation by optical fiber 2 : Single-mode optical fiber. |
| [9] | Optical fiber usage example : Example of using multimode optical fiber and single mode optical fiber. |
| [10] | Research introduction 1 : Muro et al., "Single-mode fiber with plano-convex lens that can be connected directly to the circuit. |
| [11] | Dispersion of optical fiber : Type of dispersion, loss and dispersion shift fiber. |
| [12] | Optical fiber communication system 1 : Transmitter, receiver, repeater. |
| [13] | Optical fiber communication system 2 : Loss limit, dispersion limit. |
| [14] | Research introduction 1 : Muro et al., "Poly-Si/SiO ₂ laminated walk-off polarizer having a beam-splitting angle of more than 20 degree." |
| [15] | Student presentation : Investigate the relationship with the student's research theme. |