

Lecture in Optical Materials and Devices, Part 2

1 unit (selection)

Nobuo Goto · PROFESSOR / OPTICAL MATERIALS AND DEVICES, OPTICAL SYSTEMS ENGINEERING, SYSTEMS INNOVATION ENGINEERING

Target Optical devices are key elements for optical information processing systems and optical communication systems. It is important to understand the basic effects and principle used in optical wave control. In this lecture, mathematical description of optical passive devices, optical circuits, interaction between optical waves and materials, and nonlinear optical effects is discussed. Basic technology for designing of optical devices and optical circuits is described.

Outline 1. Optical passive circuits, 2. Interaction between optical waves and materials, 3. Control of optical waves, 4. Optical nonlinear effects

Style Lecture

Keyword *optical waveguide, optical functional device, optical wave control*

Fundamental Lecture “**Advanced lecture on optical communication system**”
(1.0)

Relational Lecture “**Photonic Device**”(0.5)

Goal 1. Understanding of mathematical description of materials for optical wave control, 2. Understanding of mathematical analysis of optical waves in materials, 3. Understanding of description and analysis of optical devices and circuits.

Schedule

1. Optical waveguide and optical wave propagation
2. Analysis of directional coupled waveguides
3. Analysis of optical passive circuits consisting of coupled waveguides
4. Analysis of Bragg reflection waveguides
5. Electro-optic effects and wave control in crystal
6. Magneto-optic effect and wave control
7. Acousto-optic effect and wave diffraction
8. Optical nonlinear effect

Evaluation Criteria Attitude toward lecture (40%), Report (60%). More than 60% of the total score is required.

Textbook T. Jinpo ed., Optical electronics, Ohm-sha, 1997.

Reference

- ◇ Y. Suematsu and K. Iga, Introduction to optical fiber communication, Ohm-sha, 2006.
- ◇ T. Kurokawa, Optical functional device, Kyoritsu, 2004.

◇ H. Nishihara, M. Haruna and T. Suhara, Optical integrated circuits, Ohm-sha, 1985.

Contents <http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=216822>

Student Able to be taken by student of other faculty and university

Contact

⇒ Goto (opt408, +81-88-656-9415, goto@opt.tokushima-u.ac.jp) MAIL (Office Hour: 8:30-17:00)