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| Course Name [科目名] | Optical Communication System |
| Instructor Name [教員] | Hiromasa Shimizu, Yosuke Tanaka |
| Office Hours and Contact Information  [オフィスアワー、連絡先] | Shimizu  Location: Building N1-313B  Telephone: +81-42-388-7996  E-mail: h-shmz@cc.tuat.ac.jp  Office hours: after class or by appointment  Tanaka  Location: Building N1-206A  Telephone: +81-42-388-7405  E-mail: tyosuke@cc.tuat.ac.jp  Office hour: after class or by appointment |
| Course Structure [授業形態] | Lecture and Exercise |
| Course Credits [単位数] | 3 |
| Course Overview [概要] | In the lectures, we focus on light propagation in optical waveguides such as semiconductor lasers, and optical fibers for optoelectronic devices. The fundamental of optical mode and its influences on the light propagation are discussed. We also study optical pulse propagation, its broadening, and compression. |
| Course Key Words [キーワード] | Wave equation, Fresnel reflection, Optical waveguide, Optical fiber, Optical pulse |
| Academic Goal [目標] | 1. understand the principle of the Fresnel reflection and optical waveguide.  2. understand the optical fiber communication.  3. understand the optical pulse characteristics in an optical fiber. |
| Course Schedule [授業内容] | Week 1: Orientation  Introduction to optical communications, and Review of Maxwell equation  Week 2: Wave equation, and boundary condition at optical reflection  Wave equation, boundary condition and Fresnel reflection  Week 3: Fresnel reflection  Amplitude reflectivity, Total internal reflection, Polarization.  Week 4-6: Optical slab waveguide  Propagation constant, single and multimode waveguide. Dispersion by polarization, and mode number.  Week 7: Propagation of optical pulse 1  Optical pulse propagation in dispersive media  Week 8: Propagation of optical pulse 2  Dispersion-induced chirp and pulse broadening  Week 9: Propagation of optical pulse 3  Self-phase modulation and pulse compression  Week 10: Final Examination |
| Textbooks, References,  and Supplementary Materials | A. Yariv and P. Yeh, “Photonics ~Optical Electronics in Modern Communication~“ Oxford University Press, 2007  Handouts and materials given on or before the lectures |
| Grading Philosophy  (Percentage / Criteria / Methodology) | Participation in discussions during the lecture, oral presentation, and final examination or reports. |
| Other  (i.e. Expectations on Classroom  Conduct and Decorum etc.)  [その他] |  |