

Electro-Optics

Course coordinator: Yoonchan Jeong

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Venue & time: 301-104, 15:30-16:45 (Tue/Thu)

Prerequisites: Electromagnetic theory I, II, Quantum Mechanics

Credit points: 3

Course overview:

The objective of this course is to provide postgraduate students with a fundamental and advanced knowledge of the behaviour of electromagnetic waves in various optical media. Topics to be covered include: Electromagnetic Fields, Propagation of Laser Beams, Polarization of Light Waves, Electromagnetic Propagation in Anisotropic Media, Jones Calculus and its Application to Birefringent Optical Systems, Electromagnetic Propagation in Periodic Media, Electro-optics, Electro-optic Devices, and Guided Waves.

Course-book:

A. Yariv and P. Yeh, *Optical Waves in Crystals*, John Wiley, 2003.

References:

J. D. Jackson, *Classical Electrodynamics*, 3rd ed. Wiley, 1999.

A. Yariv, *Optical Electronics*, 4th ed. Saunders, 1991.

Course schedule:

Week 1: Introduction & Electromagnetic fields

Week 2: Propagation of laser beams

Week 3: Polarization of light waves

Week 4: Electromagnetic propagation in anisotropic media

Week 5: Electromagnetic propagation in anisotropic media

Week 6: Summary / Exam 1

Week 7: Jones calculus and its application to birefringent optical systems

Week 8: Jones calculus and its application to birefringent optical systems

Week 9: Electromagnetic propagation in periodic media

Week 10: Electromagnetic propagation in periodic media

Week 11: Summary / Exam 2

Week 12: Electro-optics

Week 13: Electro-optic devices

Week 14: Guided waves

Week 15: Summary / Exam 3

Assessment methods:

Attendance, participation & assignment (20%), exam 1 (30%), exam 2 (30%), exam 3 (20%)