ECE452: Electromagnetic Waves and Electro-Optics  Semester: Fall 2020

CRN: 29954  Credit: 3 hours  Prerequisite: ECE350
Meeting Time & Classroom: TR 12:30-13:50, ECEB 3015

Instructor: Professor Yurii Vlasov, Office: MNTL 1250
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Office Hours: by appointment at MNTL 1250 (3-1870)

Grader: TBD, E-mail: @illinois.edu
Office Hours: TBD

Catalog description: Electromagnetic waves, polarizations, and applications to photonic and electrooptical devices, metallic and optical waveguides

Course Outline:  Hours (approx.)
2. Reflection and refraction of uniform plane waves, boundary conditions, polarizations, oblique incidence, Brewster angle, critical angle, multilayered media, matrix optics  8
3. Wave propagation in anisotropic media: index ellipsoid, ordinary and extraordinary waves, characteristic polarizations, polaroid and quarter-wave plate, applications  5
4. Waveguide theory: metallic waveguides, optical dielectric waveguides, surface plasmonic waveguides, optical fibers, numerical aperture, signal attenuation and dispersion  9
5. Waveguide couplers, coupled-mode theory, coupled waveguides, directional couplers, optical ring resonators and add-drop filters  6
6. Electro-optics: linear electro-optical effects, wave propagation in electro-optic crystals, amplitude modulators, phase modulators, photonic or electro-optical waveguide modulator devices  7

Midterm exams  TOTAL = 3

Hours (approx.)

Text:
Reference:

Basis for grade:
Homework and participation  25%
Exam I  25%
Exam II  25%
Final Exam  25%
Total  100%

Unless specified otherwise, homework will be assigned weekly on Thursdays. No late homework will be accepted unless there are special circumstances and subject to approval by instructor.