

**ECE 452 Electromagnetic Waves and Electro-Optics****Prof. Yurii Vlasov**

Fall 2020 Tentative Schedule (Approximate)

12:30 – 13:50 TR 3015 Electrical and Computer Eng. Bldg.

<b>Tuesday (12:30 – 13:50) ECEB 3015</b>	<b>Thursday (12:30 – 13:50) ECEB 3015</b>
<b>8/25 L1.</b> Introduction, Maxwell's equations. Boundary conditions (§2.1)	<b>8/27 L2.</b> Time-harmonic fields and duality principle, Poynting's theorem (§5.1, §5.2) <b>Will be a makeup lecture on 9/05 instead</b>
<b>9/01 L3.</b> Plane wave solutions (§5.3). Propagation in isotropic media (§5.4)	<b>9/03 L4.</b> Wave propagation in lossy media (§5.5) <b>(HW1 Due)</b>
<b>9/8 L5.</b> Plane wave reflection from a surface. Brewster angle, critical angle (§5.6)	<b>9/10 L6.</b> Matrix optics (§5.7) <b>(HW2 Due)</b>
<b>9/15 L7.</b> Propagation-matrix approach (§5.8)	<b>9/17 L8.</b> Multilayered and periodic media (§5.8-5.9) <b>(HW3 Due)</b>
<b>9/22 Midterm Exam I</b>	<b>9/24 L9.</b> Light propagation in uniaxial media (§6.1)
<b>9/29 L10.</b> Ordinary and extraordinary waves (§6.1)	<b>10/01 L11.</b> Polaroid and quarter-wave plate (§6.1) Metallic waveguides (class notes) <b>(HW4 Due)</b>
<b>10/6 L12.</b> Symmetric dielectric waveguides TE modes (§7.1)	<b>10/8 L13.</b> Propagation constant and effective index, Optical confinement factor (§7.1) <b>(HW5 Due)</b>
<b>10/13 L14.</b> TM modes, Cutoff conditions, dispersion relation (§7.1)	<b>10/15 L15.</b> Asymmetric dielectric waveguides (§7.2), Ray optics approach (§7.3) <b>(HW6 Due)</b>
<b>10/20 L16.</b> Surface plasmon waveguides (§7.7)	<b>10/22 L17</b> Waveguide couplers (§8.1) <b>(HW7 Due)</b>
<b>10/27 L18.</b> Coupled optical waveguides (§8.2)	<b>10/29 L19.</b> Applications of optical waveguide couplers (§8.3)
<b>11/03 Midterm Exam II</b>	<b>11/05 L20.</b> Optical ring resonators and add-drop filters (§8.4)
<b>11/10 L21.</b> Optical fibers, numerical aperture (Class notes)	<b>11/12 L22.</b> Attenuation in optical fibers (Class notes) <b>(HW8 Due)</b>
<b>11/17 L23.</b> Signal distortion in optical waveguides, group delay, dispersions (Class notes)	<b>11/19 L24.</b> Electro-optical effects and Amplitude modulators (§13.1) <b>(HW9 Due)</b>
<b>11/24 Thanksgiving Break</b>	<b>11/26 Thanksgiving Break</b>
<b>12/1 L24.</b> Transverse amplitude modulator (§13.1)	<b>12/3 L26.</b> Phase modulators (§13.2) <b>(HW10 Due)</b>
<b>12/8 L27.</b> Electro-optical effects in waveguide devices (§13.3)	<b>12/10</b> Reading day (no class)
<b>12/17 Final Exam week: Final exam date TBA</b>	

All section numbers refer to the text: S. L. Chuang, Physics of Photonic Devices, 2<sup>nd</sup> edition.