# Physics 2321. Light and Optics material

Chapters covered in last third of class: 15, 16, (31), 32, 33.

Sections skipped or de-emphasized:

- No problems assigned for Ch. 31, but some of that material on the particle-wave duality of light was in the lectures.
- Ch. 32.8 and 32.10 are not required.
- Ch. 33.3-on are not required.

Equations for Final.

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**Ch.31** Maxwell's Equations:

**31-6a** $\oint \vec{E} \cdot d\vec{A} = \frac{q}{\epsilon_0}$

**31-6b** $\oint \vec{B} \cdot d\vec{A} = 0$

**31-6c** $\oint \vec{E} \cdot d\vec{s} = -\frac{d\Phi_B}{dt}$

**31-6d** $\oint \vec{B} \cdot d\vec{s} = \mu_0 I + \epsilon_0 \mu_0 \frac{d\Phi_E}{dt}$

**31p.909** Speed of light: $c = \frac{1}{\sqrt{\mu_0 \epsilon_0}}$

**Golden rule** $c = \lambda f$

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**32p.927** Law of reflection: $\theta_i = \theta_r$

**32-1** Radius of curvature: $R = 2f$

**32-2** Mirror equation (spherical mirrors): $\boldsymbol{\frac{1}{d_o} + \frac{1}{d_i} = \frac{1}{f} = \frac{2}{R}}$

**page 935** Sign conventions for spherical mirrors

**32-3** Magnification: $M \equiv \frac{h'}{h}$

**32-3** Magnification for mirrors (and lenses): $M = -\frac{d_i}{d_o}$

**32-4** Index of refraction: $n = \frac{c}{v}$

**32-5** Snell's law: $\boldsymbol{n_1 \sin\theta_1 = n_2 \sin\theta_2}$

**32-6** Wavelength in medium with index of refraction n: $\boldsymbol{\lambda_n = \frac{\lambda}{n}}$

**32-7** Critical angle for total internal reflection: $\sin\theta_c = \frac{n_2}{n_1}$ (for $n_1 > n_2$)

**33-2** Thin lens equation: $\boldsymbol{\frac{1}{d_o} + \frac{1}{d_i} = \frac{1}{f}}$

**33-4 SKIP** Lens-makers equation: $\boldsymbol{\frac{1}{f} = (n-1)(\frac{1}{r_1} + \frac{1}{r_2})}$ **SKIP**

**page 963** Sign conventions for thin lenses

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