Electrical Engineering 5200: Classical Optics  
Prior Number – Electrical Engineering 323

Credit and Contact Hours  
3 credit hours lecture (Two 75 minute or three 50 minute sessions per week)

Instructor  
Robert DuBois, Ph.D.

Text  

Catalog Information  
Physical optics and advanced topics in geometrical optics. Topics include ray propagation, electromagnetic propagation, mirrors, lenses, interference, diffraction, polarization, imaging systems, and guided waves.

Prerequisites  
Mathematics 2222 (22) Calculus III and Physics 2135 (24). (Co-listed with Physics 4503).

Required or Elective  
Selected elective

Course Goals  
General Outcomes  
1. Geometrical optics  
2. Wave optics (emphasis on interference and diffraction for near field and far field).  
3. Wave optics as applied to slits, gratings, and optical coatings.  
4. Polarization
### Relationship of Course to Program Outcomes

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<th>ECE Outcome</th>
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<td>Application of concepts in mathematics and physics</td>
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<td>Fundamental topics and concepts in optics</td>
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S – strong connection; M – medium connection; W – weak connection

### Topics Covered

1. Nature, production, and measurement of light; geometrical optics (1 week)
2. Matrix methods in paraxial optics (1.67 weeks)
3. Wave equations, superposition of waves (1.33 weeks)
4. Interference of light, optical interferometry (1.33 weeks)
5. Coherence, holography (1.33 weeks)
6. Matrix treatment of polarization, production of polarized light (1.33 weeks)
7. Fraunhofer diffraction (1 week)
8. The diffraction grating, Fresnel diffraction (1.33 weeks)
9. Multilayer films, Fresnel equations (1.33 weeks)
10. Lasers (0.67 weeks)
11. Reviews and examinations (2 weeks)