EE - 3090
Introduction to Photonics

Curricular Designation: EE: elective          CpE: N/A

Catalog Description:
EE 3090 – Introduction to Phototonics First order geometrical optics including image formation: introduction to third order aberrations, interference, polarization, spatial and temporal coherence, lasers and Gaussian beam propagation; diffraction; optical sources and detectors; selected applications of optics.

Credits: 3.0 Lec-Rec-Lab: (3-0-0) Semesters Offered: Fall: Must be enrolled in one of the following Major(s): Computer Engineering, Electrical Engineering Pre-requisites: EE 3140(C) and (MA 3520 or MA 3521 or MA 3530 or PH2200(C))

Textbooks(s) and/or Other Required Materials:

Prerequisites by Topic:
1. Familiarity with the concept of waves, and their mathematical description.
2. Familiarity with the basics of electromagnetics and geometrical optics.

Course Objectives:
1. Understand the basics of light wave propagation.
2. Understand the dual wave-particle nature of light.
3. Understand geometrical optics and the basics of lens system analysis.
4. Understand the basics of polarization, and polarization sensitive optical devices.
5. Understand the basics of interference phenomenon.

Topics Covered:
1. History of optics.
2. Wave motion
5. Geometrical optics.
6. Polarization.
7. Interference.
Relationship of the Course Content to Program Outcomes:

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<tr>
<th>Outcome</th>
<th>Topics and Level of Coverage</th>
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<tr>
<td>a  an ability to apply knowledge of mathematics, science and engineering</td>
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<td>b  an ability to design and conduct experiments, as well as to analyze and interpret data</td>
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<td>c  an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, health and safety, manufacturability and sustainability</td>
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<td>d  an ability to function on multi-disciplinary teams</td>
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<td>e  an ability to identify, formulate and solve engineering problems</td>
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<td>f  an understanding of professional and ethical responsibility</td>
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<td>g  an ability to communicate effectively</td>
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<td>h  the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental and societal context</td>
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<td>i  a recognition of the need for, and an ability to engage in life-long learning</td>
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<td>j  a knowledge of contemporary issues</td>
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<td>k  the ability to use the techniques, skills, and modern engineering tools necessary for the practice of electrical engineering</td>
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Contribution of Course to Meeting Degree Requirements:
3 Credit Hours – Engineering Topics

Class/Laboratory Schedule (note: 1 hour = 50 minutes):
Lecture: 42 hours = 3 hours/week for 14 weeks

Prepared by:
Jeremy P. Bos, Asst. Professor, November 29, 2016