**COURSE:** EECS 438  
**TITLE:** Advanced Lasers and Optics Laboratory  
**PREREQUISITES:** EECS 334 or 434 or Graduate ELECTIVE  

**TEXTBOOK:** E. Hecht, *Optics*, 4th ed., Addison-Wesley  

**CATALOG DESCRIPTION:** Construction and design of lasers; gaussian beams; nonlinear optics; fiber optics; detectors; dispersion; Fourier optics; spectroscopy. Project requires the design and set-up of a practical optical system.  

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<th>COURSE OBJECTIVES:</th>
<th>TOPICS COVERED:</th>
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<td>1. To teach students how to use state-of-the-art equipment and optical laboratory techniques; 2. To teach students how to work on a large project in teams: breaking it down, organization;</td>
<td>1. Laser and laboratory safety 2. Gaussian beams, polarization, fiber optics 3. Interferometry and spectroscopy 4. Laser design and modeling and detection 5. Autocorrelation and dispersion 6. Nonlinear optics; design project</td>
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**COURSE OUTCOMES [Program Outcomes Addressed]**  
1. Ability to design and model laser resonators; and multi-element optical systems; [1,2,3,5,11]  
2. Ability to design optical components for focusing, imaging, and spatial filtering; [1,2,3,5,11]  
3. Ability to design and use optical diagnostic tools (spectrometers & autocorrelators); [1,2,11]  
4. Ability to use optical coatings; and nonlinear optical methods for frequency conversion; [”]  
5. Ability to work in teams, coordinate and organize, and present goals and results. [4,5,7]  

**PROGRAM OUTCOMES ADDRESSED:** 1,2,3,4,5,7,11  
**PROFESSIONAL COMPONENT ADDRESSED:**  
**PREPARED BY:** Andrew E. Yagle on Nov. 25, 2004  

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<tr>
<th>ASSESSMENT (Course outcomes)</th>
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<tr>
<td>1. Laboratory written reports [1,2,3,4] 2. Project written and oral reports [1,2,3,4,5]</td>
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**CLASS/LAB SCHEDULE:**  
**LECTURE:** 2 per week @ 1 hour  
**LAB:** 1 per week @ 4-6 hours  

**COURSE DESCRIPTION:** University of Michigan, College of Engineering, ELECTRICAL ENGINEERING PROGRAM