Laser Theory and Design  
EEL 5447  Section 2C96

Class Periods:  Tuesday, Period 2,3 (8:30 – 10:25), Thursday, Period 3 (9:35 – 10:25)  
Location:  Black Hall, Room 415  
Academic Term:  Fall 2019

Instructor:  Prof. Henry Zmuda  
email:  zmuda@ece.ufl.edu  
Phone:  (352) 392 – 0990  
Mobile:  (850) 225 – 9200 (emergencies only please)  
Office Hours:  TBA, always by appointment or chance. The Thursday class begins at 9:35, however, I will be present in the classroom from 8:30 to discuss class material or to answer questions.

Teaching Assistant/Peer Mentor/Supervised Teaching Student:  None

Course Description  
Credits: 3; Studies the field of semiconductor optoelectronics and the physics of optoelectronic devices including the interaction of photons with electrons and holes in a semiconductor leading to the realization of optoelectronic devices such as photon amplifiers, LEDs, diode lasers, electro-absorption modulators, and detectors, including their design and application-specific characteristics.

Course Pre-Requisites / Co-Requisites  
Physics of Electrical Engineering (EEL 3000). The ability to write a computer program is essential. A working knowledge of Matlab is sufficient.

Course Objectives:  The student will learn how to design, construct, and test (in principle, no actual construction is performed) a variety of optoelectronic devices to meet specifications with regard to emission/detection wavelength, power level, and size.

Materials and Supply Fees:  None

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Required Textbooks and Software  
None – Extensive course notes developed by the instructor are posted on the Canvas page.

Recommended Textbooks  
Title:  Laser Diodes and Photonic Integrated Circuits  
Authors:  Larry Coldren, Scott Corzine, and Milan L. Mashanovitch  

Course Schedule  
Weeks 1, 2:  Electromagnetic for lasers  
Exam 1  
Weeks 3, 4:  Atomic radiation, solid-state amplifiers and lasers  
Weeks 5, 6:  Essentials of quantum mechanics  
Exam 2  
Weeks 7, 8:  Essentials of solid-state physics  
Week 9:  Light emitting diodes  
Weeks 10, 11:  Semiconductor optical amplifiers and lasers  
Exam 3  
Week 12:  Further discussion of various lasers  
Exam 4  
Week 13, 14:  Advanced topics on laser physics  
Week 15:  Final Exam
**Attendance Policy, Class Expectations, and Make-Up Policy**

Attendance is not required. Makeup for a missed exam(s) due to an excused absence is arranged with the instructor. Excused absences must be in compliance with university policies in the Graduate Catalog (http://gradcatalog.ufl.edu/content.php?catoid=10&navoid=2020#attendance) and require appropriate documentation.

**Evaluation of Grades**

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Total Points</th>
<th>Percentage of Final Grade</th>
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<tbody>
<tr>
<td>Exam (3)</td>
<td>100</td>
<td>60%</td>
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<tr>
<td>Final Exam</td>
<td>100</td>
<td>40%</td>
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**Grading Policy**

<table>
<thead>
<tr>
<th>Percent</th>
<th>Grade</th>
<th>Grade Points</th>
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<tbody>
<tr>
<td>90.0 - 100.0</td>
<td>A</td>
<td>4.00</td>
</tr>
<tr>
<td>87.0 - 89.9</td>
<td>A-</td>
<td>3.67</td>
</tr>
<tr>
<td>84.0 - 86.9</td>
<td>B+</td>
<td>3.33</td>
</tr>
<tr>
<td>81.0 – 83.9</td>
<td>B</td>
<td>3.00</td>
</tr>
<tr>
<td>78.0 - 80.9</td>
<td>B-</td>
<td>2.67</td>
</tr>
<tr>
<td>75.0 - 79.9</td>
<td>C+</td>
<td>2.33</td>
</tr>
<tr>
<td>72.0 – 74.9</td>
<td>C</td>
<td>2.00</td>
</tr>
<tr>
<td>69.0 - 71.9</td>
<td>C-</td>
<td>1.67</td>
</tr>
<tr>
<td>66.0 - 68.9</td>
<td>D+</td>
<td>1.33</td>
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<tr>
<td>63.0 - 65.9</td>
<td>D</td>
<td>1.00</td>
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<tr>
<td>60.0 - 62.9</td>
<td>D-</td>
<td>0.67</td>
</tr>
<tr>
<td>0 - 59.9</td>
<td>E</td>
<td>0.00</td>
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More information on UF grading policy may be found at: http://gradcatalog.ufl.edu/content.php?catoid=10&navoid=2020#grades

**Students Requiring Accommodations**

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, https://www.dso.ufl.edu/drc) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

**Course Evaluation**

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at https://gatorevals.ua.ufl.edu/students/. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via https://ufl.bluera.com/ufl/. Summaries of course evaluation results are available to students at https://gatorevals.ua.ufl.edu/public-results/.

**University Honesty Policy**

UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Honor Code (https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/) specifies a number of behaviors that are in
violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

Commitment to a Safe and Inclusive Learning Environment
The Herbert Wertheim College of Engineering values broad diversity within our community and is committed to individual and group empowerment, inclusion, and the elimination of discrimination. It is expected that every person in this class will treat one another with dignity and respect regardless of gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture.

If you feel like your performance in class is being impacted by discrimination or harassment of any kind, please contact your instructor or any of the following:
- Your academic advisor or Graduate Program Coordinator
- Robin Bielling, Director of Human Resources, 352-392-0903, rbielling@eng.ufl.edu
- Curtis Taylor, Associate Dean of Student Affairs, 352-392-2177, taylor@eng.ufl.edu
- Toshikazu Nishida, Associate Dean of Academic Affairs, 352-392-0943, nishida@eng.ufl.edu

Software Use
All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

Student Privacy
There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see: https://registrar.ufl.edu/ferpa.html

Campus Resources:

Health and Wellness

<table>
<thead>
<tr>
<th>U Matter, We Care:</th>
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<tbody>
<tr>
<td>Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact <a href="mailto:umatter@ufl.edu">umatter@ufl.edu</a> so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.</td>
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| Counseling and Wellness Center: | http://www.counseling.ufl.edu/cwc, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies. |

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<thead>
<tr>
<th>Sexual Discrimination, Harassment, Assault, or Violence</th>
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<tr>
<td>If you or a friend has been subjected to sexual discrimination, sexual harassment, sexual assault, or violence contact the Office of Title IX Compliance, located at Yon Hall Room 427, 1908 Stadium Road, (352) 273-1094, <a href="mailto:title-ix@ufl.edu">title-ix@ufl.edu</a></td>
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<tr>
<th>Sexual Assault Recovery Services (SARS)</th>
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<tbody>
<tr>
<td>Student Health Care Center, 392-1161.</td>
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| University Police Department at 392-1111 (or 9-1-1 for emergencies), or http://www.police.ufl.edu/ |
E-learning technical support, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu. https://lss.at.ufl.edu/help.shtml.


Library Support, http://cms.uflib.ufl.edu/ask. Various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring. https://teachingcenter.ufl.edu/.

