



Course Syllabus: Semiconductor Optoelectronic Devices - EE 208

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| Division | Computer, Electrical and Mathematical Sciences & Engineering |
| Course Number | EE 208 |
| Course Title | Semiconductor Optoelectronic Devices |
| Academic Semester | Spring |
| Academic Year | 2016/2017 |
| Semester Start Date | 01/22/2017 |
| Semester End Date | 05/18/2017 |
| Class Schedule (Days & Time) | 04:00 PM - 05:30 PM Sun Mon |

| Instructor(s) | | | | |
|---------------|-----------------------|-------|-----------------|-----------------|
| Name | Email | Phone | Office Location | Office Hours |
| Jr-Hau He | jrhou.he@kaust.edu.sa | | | Tuesday 1pm-4pm |

| Teaching Assistant(s) | |
|-----------------------|-------|
| Name | Email |
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| Course Information | |
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| Comprehensive Course Description | Materials for optoelectronics, optical processes in semiconductors, absorption and radiation, transition rates and carrier lifetime. Principles of LEDs, lasers, photodetectors, modulators and solar cells. Optoelectronic integrated circuits. Designs, demonstrations and projects related to optoelectronic device phenomena. |
| Course Description from Program Guide | Materials for optoelectronics, optical processes in semiconductors, absorption and radiation, transition rates and carrier lifetime. Principles of LEDs, lasers, photodetectors, modulators and solar cells. Optoelectronic integrated circuits. Designs, demonstrations and projects related to optoelectronic device phenomena. |
| Goals and Objectives | <ul style="list-style-type: none"> -To introduce the history and development of optoelectronics -To inspire students toward optoelectronics research -To generate novel ideas from group discussion |
| Required Knowledge | Required Knowledge: Physics |
| Reference Texts | "Optoelectronics and Photonics: Principles and Practices," by S. O. Kasap, ISBN-10: 0132151499, Prentice Hall, 2013. "Optical Semiconductor Devices", by Mitsuo Fukuda, ISBN: 978-0-471-14959-0, Wiley |
| Method of evaluation | 30.00% - Midterm exam 20.00% - Homework /Assignments 30.00% - Final exam 20.00% - Course Project(s) |
| Nature of the assignments | 1. case study*1, 2. paper presentation*1, 3. written assignment*2 |

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| Course Policies | <p>Attendance Policy: Students are required to attend class, and attendance will be taken if necessary. 3 absences are allowed for documented personal/medical reasons. Please email me in advance if you know you will miss a class. However, on the exam dates listed in the course calendar, attendance is absolutely mandatory. No makeup exams will be given.</p> <p>Cheating Policy and Penalty for Cheating: Cheating is defined as "intentionally using or attempting to use, or intentionally providing or attempting to provide, unauthorized materials, information, or assistance in any academic exercise." This includes any group efforts on assignments or exams unless specifically approved by the professor for that assignment/exam. Evidence of fabrication or plagiarism will also result in downgrading for the course. Students who cheat on any assignment or during any examination will be assigned a failing grade for the course.</p> <p>Feedback: I as well as the KAUST value your feedback in how we can make this course better and better serve your needs. - The standard KAUST course evaluations will also be given at the end of the term. - We may have midterm teaching evaluations of the course sometime in the middle of the semester. - Anonymous feedback can be posted anytime through blackboard. - If you have any personal issues with the course, please come to office hours or setup an appointment to speak with me individually</p> |
| Additional Information | |

Tentative Course Schedule

(Time, topic/emphasis & resources)

| Week | Lectures | Topic |
|-------------|----------------------------------|---|
| 1 | Sun 01/22/2017 Mon 01/23/2017 | introduction of Semiconductor Optoelectronic Devices |
| 2 | Sun 01/29/2017 Mon 01/30/2017 | fundamentals of semiconductor I: crystal structure and electron theory |
| 3 | Sun 02/05/2017 Mon 02/06/2017 | fundamentals of semiconductor II: electronic structure |
| 4 | Sun 02/12/2017 Mon 02/13/2017 | fundamentals of semiconductor III: carrier |
| 5 | Sun 02/19/2017 Mon 02/20/2017 | PN-Junction |
| 6 | Sun 02/26/2017 Mon 02/27/2017 | Light Emitting Diodes I |
| 7 | Sun 03/05/2017 Mon 03/06/2017 | Light Emitting Diodes II |
| 8 | Sun 03/12/2017 Mon 03/13/2017 | Photovoltaic Devices I |
| 9 | Sun 03/19/2017 Mon 03/20/2017 | Photovoltaic Devices II |
| 10 | Sun 03/26/2017 Mon 03/27/2017 | Spring break |
| 11 | Sun 04/02/2017 Mon 04/03/2017 | midterm exam |
| 12 | Sun 04/09/2017 Mon 04/10/2017 | Laser Diodes & Photodetectors |
| 13 | Sun 04/16/2017 Mon 04/17/2017 | lab session I: PL & defects |
| 14 | Sun 04/23/2017 Mon 04/24/2017 | Advanced Topics: 1) Photon management in optical devices; 2) PEC for water spitting |
| 15 | Sun 04/30/2017 Mon 05/01/2017 | lab session II: Photodetector and PV characterizations |
| 16 | Sun 05/07/2017 Mon 05/08/2017 | lab session III: Laser diode characterizations |
| 17 | Sun 05/14/2017 Mon 05/15/2017 | lab session IV: LED characterizations |
| 18 | | Final exam |

Note

The instructor reserves the right to make changes to this syllabus as necessary.