ELCT 566
Semiconductor Optoelectronics

CREDITS/CONTACT HOURS: Credits: 3, Contact Hours: 37

COORDINATOR(s): Prof. Asif Khan / Dr. Ahmad Tarakji

TEXTBOOKS AND OTHER REQUIRED MATERIAL:

SUPPLEMENTAL MATERIALS:
M. E. Levinshtein, G. S. Simin, Getting to Know Semiconductors, World Scientific Pub Co.-/ISBN 9810207603

CATALOG DATA:
(Prerequisite: Credit in ELCT 221, ELCT 363, Credit or registration in ELCT 563)). Two lectures per week. Each lecture is 75 minutes in duration.

REQUIRED/ELECTIVE:
Required for Grad. Students specializing in Semiconductor Optoelectronics. Can be taken as “elective” for Undergrad.

TOPICS COVERED:
- Review of basic properties for semiconductors (2hrs)
- Optical processes in semiconductors (3hrs)
- P-N junctions, Schottky and Ohmic contacts (6hrs)
- Light emitting diodes (including Double-heterojunction LED and multi quantum well LED) (10hrs)
- Introduction to lasers (2hrs)
- Photodetectors (photoconductors, junction p-i-n photodiodes, and Schottky photodiodes) (10hrs)
- Fast optical communication components (fiber optic, optoelectronic modulation, integrated and external optic modulators) (2)
- Solar cells (2hrs)

COURSE OUTCOMES:
1. Ability to solve problems on basic semiconductor optoelectronic devices (a, b, e, k)
2. Ability to gain fundamental knowledge of basic semiconductor optoelectronic devices (a, b, c, d, e, j, k)
3. Ability to relate impacts of semiconductor material properties into the optical properties of semiconductor-devices. (a, b, c, d, e, i, k)
4. Ability to relate impacts of semiconductor material properties into the fabrications of semiconductor optoelectronic devices. (a, b, c, d, e, i, k)

Relation of course outcomes to program outcomes
H = major importance, M = moderate importance, L = minor importance, blank indicates no relation

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<thead>
<tr>
<th>Program Outcomes</th>
<th>Course Outcomes</th>
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<tbody>
<tr>
<td>an ability to apply knowledge of math, science and eng. (a)</td>
<td>H</td>
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<td>an ability to design and conduct experiments, as well as to analyze and interpret data (b)</td>
<td>H</td>
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<tr>
<td>an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability (c)</td>
<td>H</td>
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<td>an ability to function on multidisciplinary teams (d)</td>
<td>M</td>
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<td>an ability to identify, formulate, and solve engineering problems (e)</td>
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<td>a recognition of the need for, and an ability to engage in life-long learning (i)</td>
<td>M</td>
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<td>a knowledge of contemporary issues (j)</td>
<td>M</td>
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<tr>
<td>an ability to use the techniques, skills, and modern eng. tool necessary (k)</td>
<td>H</td>
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ASSESSMENT METHODS:
1. Homework
2. Two exams
3. Final
4. One project assignment