### Course Syllabus: Device Physics - EE 206

<table>
<thead>
<tr>
<th>Division</th>
<th>Computer, Electrical and Mathematical Sciences &amp; Engineering</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Number</td>
<td>EE 206</td>
</tr>
<tr>
<td>Course Title</td>
<td>Device Physics</td>
</tr>
<tr>
<td>Academic Semester</td>
<td>Spring</td>
</tr>
<tr>
<td>Academic Year</td>
<td>2019/2020</td>
</tr>
<tr>
<td>Semester Start Date</td>
<td>01/26/2020</td>
</tr>
<tr>
<td>Semester End Date</td>
<td>05/13/2020</td>
</tr>
<tr>
<td>Class Schedule (Days &amp; Time)</td>
<td>09:00 AM - 10:30 AM</td>
</tr>
</tbody>
</table>

#### Instructor(s)

<table>
<thead>
<tr>
<th>Name</th>
<th>Email</th>
<th>Phone</th>
<th>Office Location</th>
<th>Office Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Xiaohang Li</td>
<td><a href="mailto:xiaohang.li@kaust.edu.sa">xiaohang.li@kaust.edu.sa</a></td>
<td></td>
<td>3, Ibn Sina (bldg. 3)</td>
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</tbody>
</table>

#### Teaching Assistant(s)

<table>
<thead>
<tr>
<th>Name</th>
<th>Email</th>
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<tbody>
<tr>
<td>Ahmad K. Al Sulami</td>
<td><a href="mailto:AHMAD.SULAMI@kaust.edu.sa">AHMAD.SULAMI@kaust.edu.sa</a></td>
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#### Course Information

##### Comprehensive Course Description

We will focus on fundamental knowledge for electronic devices: 60% and 40% of the course contents are engineering quantum mechanics and semiconductor physics, respectively. Specifically, they include six important aspects: 1) quantum mechanical description of electrons, 2) scattering and tunneling, 3) quantum theory of crystals, 4) semiconductor in equilibrium, 5) carrier transport, and 6) nonequilibrium excess carrier in semiconductor. Comparing with EE 103 and EE 208, EE 206 will focus more on the fundamental physics that enable the devices.

The course teaching will implement classroom active learning to cultivate students' enthusiasm, higher-order thinking ability, and intellectual agility, which are critical for becoming a successful scientist or engineer.

##### Course Description from Program Guide


##### Goals and Objectives

Students will develop a strong background in essential physics knowledge for semiconductor device and material research. Equally important, the students will possess necessary ‘soft skills’ to excel in future career.

##### Required Knowledge

Students of any major who have learnt undergraduate basic physics can attend. But please note that this would not be an “easy” course. So the more you know, the better. PS: this is true for every course.

##### Reference Texts

No reference is required since class notes are sufficient. But if you like, you can have the following book. Semiconductor Physics and Devices, 4th edition

Author: Donald A. Neamen
ISBN-10: 0071089020
Method of evaluation
25.00% - Active participation
20.00% - Midterm exam
25.00% - Quiz(zes)
10.00% - Research Project
20.00% - Final exam

Nature of the assignments
There will be no assignment or homework.

Course Policies
There is no policy or punishment for absence, assignment or late work. Graduate students are adults and are expected to make decisions for your best interest.

Additional Information

<table>
<thead>
<tr>
<th>Week</th>
<th>Lectures</th>
<th>Topic</th>
</tr>
</thead>
</table>
| 1    | Mon 01/27/2020
     Wed 01/29/2020 | Opening and teaching                 |
| 2    | Mon 02/03/2020
     Wed 02/05/2020 | Teaching/Quiz                        |
| 3    | Mon 02/10/2020
     Wed 02/12/2020 | Teaching/Quiz                        |
| 4    | Mon 02/17/2020
     Wed 02/19/2020 | Teaching/Quiz                        |
| 5    | Mon 02/24/2020
     Wed 02/26/2020 | Teaching/Quiz                        |
| 6    | Mon 03/02/2020
     Wed 03/04/2020 | Teaching/Quiz                        |
| 7    | Mon 03/09/2020
     Wed 03/11/2020 | Teaching/Quiz                        |
| 8    | Mon 03/16/2020
     Wed 03/18/2020 | Preparation for midterm exam
     Midterm exam                                |
| 9    | Mon 03/23/2020
     Wed 03/25/2020 | Teaching/Quiz                        |
| 10   | Mon 03/30/2020
     Wed 04/01/2020 | Teaching/Quiz                        |
| 11   | Mon 04/06/2020
     Wed 04/08/2020 | Teaching/Quiz                        |
| 12   | Mon 04/13/2020
     Wed 04/15/2020 | Teaching/Quiz                        |
| 13   | Mon 04/20/2020
     Wed 04/22/2020 | Teaching/Quiz                        |
| 14   | Mon 04/27/2020
     Wed 04/29/2020 | Teaching/Quiz                        |
| 15   | Mon 05/04/2020
     Wed 05/06/2020 | Final exam preparation
     Final exam                                  |
| 16   | Mon 05/11/2020
     Wed 05/13/2020 | Semester ends                        |

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