

Syllabus of EE 206 Device Physics

Fall 2017

Class schedule: 10:30am-12:00pm, Sunday & Thursday, Aug 20-Dec 7 2017

Classroom: B9-RM4221

Instructor: Prof Xiaohang Li

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Office location: B3-RM3335

Office hours: 8am-12pm, Saturday. Please email me before coming since I am typically in the lab instead of being in the office.

Teaching Assistant: Ronghui Lin, ronghui.lin@kaust.edu.sa

Prerequisite: Students of any major who have learnt undergraduate basic physics can attend.

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.

Goals

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.

Reference

No reference is required. Class notes are sufficient.

Method of evaluation

Active participation: 25%; Quiz: 25%; Project: 10%; Midterm: 20%; Final 20%.

Assignments

There will be no assignment or homework.

Course policies

There is no policy or punishment for absence, assignment or late work. The students are adults and are expected to make decisions for their best interest.

Nobel Prizes for Semiconductor Devices



20XX A future device invented by KAUST students

2015 Blue light-emitting diode

2010 2D material graphene

2009 CCD sensor

2000 Heterostructure device

1973 Tunneling diode

1970 Antiferromagnetic memory device

1964 Laser

1956 Transistor