Virtual Exchange Program

Microelectronic Devices and Technology (ELEC3500)

Start date: 03/02/2020, **End date:** 15/05/2020
Platform: edX

Hong Kong University of Science and Technology

COURSE SYNOPSIS

Domain: Engineering

Title(s) of the course(s) as it appears on the platform: Principle of Semiconductor Devices - Parts 1 and 2

Language (ISO-639-1 code): en

Short description of the course: An intuitive approach to operational principles of semiconductor devices. Part 1 covers PN junction diodes, optical sensors, solar cells, LEDs, and Bipolar Junction Transistors. Part 2 covers MOS capacitors, charge coupled devices, classical MOSFETs, transistor scaling, short channel MOSFET, and nano-CMOS transistors.

Instructor(s): Professor Mansun Chan

Level: BA3

ECTS: 4.0

Workload in student hours: 182.0

Semester: 1: jan-june

Full course description: As a topic of study, semiconductor devices offer a unique challenge due to the complex mathematics involved. In this course, we take a more intuitive approach to explore the underlying concepts. Eschewing mathematics, we use engaging animations to help you visualize the working principles of many common semiconductor devices. Whether you are completely new to the subject or an experienced engineer, this course will give you a different perspective and a new way to look at the behaviors of semiconductor devices. Reducing the reliance of equations does not mean the depth of the material is sacrificed. In fact, the course provides even more in-depth explanations of key concepts. We shift the focus from quantitatively evaluating the behavior of semiconductor devices to intuitively visualizing the semiconductor device actions. Part 1 of this course offers a wide array of content - from basic PN junctions to modern nano-electronic circuit and systems. In Part 2, we expand the understanding from PN junction diodes and BJTs to MOS capacitors, charge coupled devices and MOSFETs. In addition to describing the theory of MOSFETs, the course covers some more recent development of non-traditional nano-CMOS transistors. Besides covering the existing technologies, the course will also enable you to project the development of the industry in the near future.

Prerequisites: Semiconductor Basic chemistry, some knowledge on electronic circuits

Link to course on platform: https://www.edx.org/course/principle-of-semiconductor-devices-part-i-semiconductors-pn-junctions-and-bipolar-junction-transistors-2 , https://www.edx.org/course/principle-of-semiconductor-devices-part-ii-field-effect-transistors-and-mosfets-2

Link to course in University studyplan: -

Course registration opening date: 29/12/2019

Course registration deadline: 05/01/2020

Course withdraw date: 15/02/2020

Midterm: No

Midterm details: -

Exam period start: 16/05/2020

Exam period end: 28/05/2020

Exam date: -

Exam timing: Asynchronous (exam can take place at different dates and times)

Exam start time: -

Exam end time: -

Time zone (at the time of the exam, DST): UTC+8

Exam registration date: -

Exam resit available: No

Exam resit period start: -

Exam resit period end: -

Exam resit date: -

Exam resit time start: -

Exam resit time end: -

Time zone (at the time of the resit of the exam, DST): -

Final exam type: Written

Final exam details: 3-hour exam, Open book and any printed material

Exam requirements for home university (computer, VOIP, recording materials): 3-hour exam, Open book and any printed material

Cap (maximum number of exchange students): 50.0

Offered to which partenrs: -, All partners of the Alliance(s) selected above

Link to course image: https://drive.google.com/open?id=11dH7OGkQSH8kl4QjreQ6kTDIlVDDz4wU