**Name of the module: Introduction to Semiconductors Technology**

**Number of module: 365-1-4131**

BGU Credits: 3

ECTS credits: 2

Academic year: 2013- 2014

Semester: Fall

Hours of instruction: 3 weekly hours.

Location of instruction: to be determined

Language of instruction: Hebrew

Cycle: First cycle

Position: a mandatory module for 4th year undergraduate students in the Discipline of Electronic Materials, Department of Materials Engineering to be taken on Fall semester.

Field of Education: Materials Engineering

Responsible department: Materials Engineering

General prerequisites: No prerequisites are required.

Grading scale: the grading scale would be determined on a scale of 0 – 100 (0 would indicate failure and 100 complete success 0 to 100), passing grade is 56*.*

Lecturer: Dr. Yaniv Gelbstein

Contact details: room 017, building 63

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Office hours: Thursday, from 8 to 10AM.

Module evaluation: at the end of the semester the students will evaluate the module, in order to draw conclusions, and for the university's internal needs.

Course Description: A basic course dealing with the synthesis and characterization and methods involved in materials development for the microelectronic industry.

Aims of the module: Students will learn the basics and principles of the most important process and characterization methods involved in the CMOS technology and other microelectronic devices.

Objectives of the module:

1. Reviewing of the most important process and characterization methods currently involved in the microelectronic industry.
2. Understanding of the physical mechanisms of the various process technologies in the field of microelectronics.

Learning outcomes of the module: On successful completion of the course, the students should be able to:

1. Understand the various stages involved in production of microelectronic devices.
2. Choose the most suitable manufacturing process and materials for any given microelectronic application.
3. Understand the effect of the involved materials in microelectronic based devices.

Bloom's terminology:

1. Define the operation basics of CMOS and related microelectronic devices.
2. Evaluate the advantages and disadvantages of the various experimental methods involved in the microelectronic industry.
3. Select the most appropriate materials for the various components in the device.
4. Analyze the operation conditions of microelectronic devices.
5. Develop a manufacturing process procedure of a microelectronic device.

Confirmation: the syllabus was confirmed by the faculty academic advisory committee to be valid on 2012-2013.

Last update: 1.11.2012

Attendance regulation: attendance and participation in class is not mandatory.

Teaching arrangement and method of instruction: The module consists of frontal lectures.

Assessment:

The students may decide on one of two options:

1. Exam 100%

Or

1. Exam 60% + Presentation/Report 40%

100%

Work and assignments:

Students, who will choose the first option above, will perform an exam: at the end of semester, open questions.

Students, who will choose the second option above, in addition to the exam will prepare a 15min. presentation on a novel field concerns the course topics and will present it to the class, in addition to submission of a short report summarizing their presentation.

The grades for all of the assignments will be in the scale of 0-100. The final date for submission of the report is the day of the exam at the end of the semester.

Time required for individual work: The students are expected to fully understand the basics of each lesson prior the next lesson (takes about 3 hours per week) in order to follow up the basic ideas of the course. Students who choose the second option above, will work about 40h on preparing the presentation and report.

Module Content\ schedule and outlines:

Lesson 1: Review of the course topics, including a brief description of the various technologies involved in the microelectronic industry.

Lessons 2-4: Review of the electronic properties of semiconductors.

Lessons 5-7: Review of the basics of crystal growth.

Lessons 8-10: Detailed description processes involved in MOSFET fabrication.

Lessons 11-12: Detailed description of the diffusion process in the semiconductors industry.

Required reading: Course presentations as appearing in the High-Learn site of the university.

Additional literature:

* S.M. SZE, “Semiconductor Devices, Physics and Technology”, John Wiley & Sons, New-York (1985).