

The Hebrew University of Jerusalem

Syllabus

The physics of photovoltaic cells and solar systems - 77710

Last update 18-08-2016

HU Credits: 3

Degree/Cycle: 2nd degree (Master)

Responsible Department: physics

Academic year: 0

Semester: 2nd Semester

Teaching Languages: Hebrew

Campus: E. Safra

Course/Module Coordinator: Prof Amir Saar

Coordinator Email: Saar.Amir@mail.huji.ac.il

Coordinator Office Hours: Tuesday 10-12

Teaching Staff:

Prof Amir Saar

Course/Module description:

Principles of solar energy conversion and the physics of photovoltaics (PV). Groups and materials used for PV. Solar systems

Course/Module aims:

Understanding the principles of operation of cells in photovoltaic and solar energy conversion.

Knowledge of the materials used in the manufacture of PV cells

Learning outcomes - On successful completion of this module, students should be able to:

Solar energy and energy conversion techniques

Fundamentals of semiconductor physics and photovoltaic (PV) cells

Generation-recombination in semiconductors

p-n junctions in equilibrium & under illumination

metal-semiconductor & electro-chemical junctions

Solar cells: Si, GaAs amorphous Si, thin film cells and more

Methods to increase cell's efficiency

Solar systems & modules; basic engineering concepts

Attendance requirements(%):

70

Teaching arrangement and method of instruction: lecture

Course/Module Content:

Solar energy and energy conversion techniques

Fundamentals of semiconductor physics and photovoltaic (PV) cells

Generation-recombination in semiconductors

p-n junctions in equilibrium & under illumination

metal-semiconductor & electro-chemical junctions

Solar cells: Si, GaAs amorphous Si, thin film cells and more

Methods to increase cell's efficiency

Solar systems & modules; basic engineering concepts

Required Reading:

J. Nelson, "The physics of solar cells" (imperial college, 2003)

P. Würfel, "physics of solar cells" (Wiley-VCH, 2013)

S. J. Fonash, "Solar cell device physics (AP, 2010).

Additional Reading Material:

Reviews and articles will be provided during the course

Course/Module evaluation:

End of year written/oral examination 0 %

Presentation 20 %

Participation in Tutorials 0 %

Project work 80 %

Assignments 0 %

Reports 0 %

Research project 0 %

Quizzes 0 %

Other 0 %

Additional information:

none