האוניברסיטה העברית בירושלים
THE HEBREW UNIVERSITY OF JERUSALEM

The Hebrew University of Jerusalem

Syllabus

Introduction to the Modern Physics - 77129

Last update 14-11-2013

HU Credits: 2

Degree/Cycle: 1st degree (Bachelor)

Responsible Department: Physics

Academic year: 2014

Semester: 2nd Semester

Teaching Languages: Hebrew

Campus: Mt. Scopus

Course/Module Coordinator: Issachar Unna

Coordinator Email: unna@mail.huji.ac.il

Coordinator Office Hours: Tuesday 10:00-11:00 Kaplun

Teaching Staff:

Prof Issachar Unna

Course/Module description:

The course will give an introduction to the ideas and discoveries of physics in the 20th century. We shall start with the basic concepts of space, time, matter and light according to Newton and to Einstein's theory of relativity. We shall discuss the theory of gravitation of Newton and Einstein. The great discoveries in modern cosmology (black holes, dark matter, big bang) will be outlined. We shall discuss the laws of thermodynamics and, in particular, the 2nd law and the concept of entropy. Modern aspects of energy (especially, nuclear energy) will be elaborated on. The atomic consistency of matter will be discussed. Finally, an introduction to the structure of the atom and quantum theory will provide the basis for our modern understanding of matter.

Course/Module aims:

Study of the central ideas which changed our knowledge of the cosmos and the atom

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

Description and calculations with the laws of Newton and Einstein.
Understanding of orders of magnitude of cosmological distances and times.
Understanding of orders of magnitudes and calculations in thermodynamics.
Knowledge of magnitudes for atoms and molecules.
Understanding of the main ideas of quantum physics.

Attendance requirements(%):

None

Teaching arrangement and method of instruction: Lecture. Exercises and assignments will be given.

Course/Module Content:

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atomic consistency of matter will be discussed. Finally, an introduction to the structure of the atom and quantum theory will provide the basis for our modern understanding of matter.

Required Reading:
None

Additional Reading Material:
I. Unna - The Physics of Energy (The Broadcast University, Ministry of Defense, 2002)
I. Unna - Quantum Physics (The Broadcast University, Ministry of Defense, 1993)
T. Piran - The Big Bang Theory (The Broadcast University, Ministry of Defense, 1996)

P. Rorlich - From Paradox to Reality: The Central Ideas of Modern Physics (Magnes 1995)
A. Segra - From X-Rays to Quarks: Modern Physicists and their discoveries (Keter 1986) This book has citations to other literature in hebrew
I. Kirsh - The Universe According to Modern Physics (Am Oved, 2006) (This is an enjoyable read written by a great physicist)
P. Atkins - Galileo's Finger: Ten of Science's Great Ideas [ch.3-9] (Magnes, 2008)

Course/Module evaluation:
End of year written/oral examination 90 %
Presentation 0 %
Participation in Tutorials 0 %
Project work 0 %
Assignments 10 %
Reports 0 %
Research project 0 %
Quizzes 0 %
Other 0 %

Additional information:
None