



The Hebrew University of Jerusalem

Syllabus

Astrobiology and life in the Universe - 77212

Last update 07-03-2022

HU Credits: 2

Degree/Cycle: 1st degree (Bachelor)

Responsible Department: Physics

Academic year: 0

Semester: 2nd Semester

Teaching Languages: Hebrew

Campus: Mt. Scopus

Course/Module Coordinator: Amri Wandel

Coordinator Email: amri@huji.ac.il

Coordinator Office Hours: by appointment

Teaching Staff:

Dr. Amri Wandel

Course/Module description:

Introduction to astrobiology and the search of life in space. We will learn the most recent methods of detecting planets and bio-signatures in distant solar systems. Finally we will try to answer the oldest question: are we alone?

Course/Module aims:

Develop original thinking about the search of extra-terrestrial life.

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

Understand the methods of finding exoplanets and seeking biosignatures.
Understand astronomical distances and how we measure them.

Attendance requirements(%):

None, recommended to attend online at least 50%

Teaching arrangement and method of instruction: Online lectures in Zoom.
Presentations, Moodle, sky watching tour (optional).

Course/Module Content:

1. Introduction: From the Solar System to exoplanets and life
2. The evolution of life on Earth and implications to life on other planets
3. Water and the potential for life on Venus, Earth and Mars
4. Water and the potential of life on the outer planets: Jupiter, Saturn, and their moons: Europe, Anceadus and Titan
5. Biology in the small bodies in the Solar System: carbonaceous meteorites, asteroids and comets
6. The Habitable Zone of our solar system and in other systems
7. Search for planets around other stars using the Doppler method
8. Discovery of planets in other solar systems by the Kepler telescope and the transit method
9. How can we look for signs of life on distant planets?
10. The definition of life, the components necessary for the evolution of life, life in extreme environments on Earth and beyond
11. Estimating the prevalence of biology on exoplanets and future projects
12. The Drake equation, interstellar communication, SETI - the search for extraterrestrial intelligence
13. Advanced propulsion techniques, space flight, galactic colonialism, the Fermi

paradox

Required Reading:

Textbook: Astrophysics and Life in the Universe, Amri Wandel, Academon 2021.

Life in the Universe 4th Edition, Jeffrey O. Bennett, Seth Shostak

Rendezvous in the Milky Way, Hagai Netzer and Ami Ben-Bassat, 2020

Additional Reading Material:

Astrophysics and Life in the Universe, Amri Wandel. Academon 2021 (Chs. 5-6)

The Universe: Introduction to Astronomy, Meidav, Brosch, Netzer 2013

Intr. to Astrobiology /Gilmour, Sephton 2003

Grading Scheme:

Additional information:

Taught by Zoom

Home quizz