The Hebrew University of Jerusalem

Syllabus

Global Warming Science - 82508

Last update 19-10-2021

HU Credits: 3

Degree/Cycle: 1st degree (Bachelor)

Responsible Department: Atmospheric Sciences

Academic year: 0

Semester: 2nd Semester

Teaching Languages: English

Campus: E. Safra

Course/Module Coordinator: Dr. Nathan Steiger

Coordinator Email: nathan.steiger@mail.huji.ac.il

Coordinator Office Hours: By appointment

Teaching Staff:

Dr. Nathan Steiger

Course/Module description:

This course will cover the science of anthropogenic climate change and global warming. We will focus on the fundamental processes that drive global warming and on the evidence for past and present climate change. This course will examine the climate impacts of global warming and the science behind potential mitigation and adaptation strategies.

Course/Module aims:

Understanding the science of global warming and its associated climate impacts

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

Understand and clearly articulate: (1) the history of the science of global warming, (2) the greenhouse effect, (3) climate forcings and feedbacks, (4) the carbon cycle, (5) how climate models work, (6) the nature of projections of future climate, (7) climate change impacts, mitigation, and adaptation

Attendance requirements(%):

None

Teaching arrangement and method of instruction: This is a discussion-based and problem solving-based class. In addition to lecture time, class time will also be spent solving problems in small groups and discussing the material in class. Students will also make significant use of simple climate models.

Course/Module Content:

History of climate science and global warming

Properties of Earth's atmosphere and oceans

Paleoclimatic context for the present

The instrumental climate record

The greenhouse effect: blackbody radiation, simple models of Earth's radiation balance, physics of greenhouse gases

Large-scale features of weather and climate

Climate forcings and feedbacks

The carbon cycle and perturbations to it

Climate models: history and design, hierarchy of models, model verification and validation, probabilistic projections of future climate

Global warming impacts

Geoengineering

Potential global warming mitigation and adaptation strategies

Required Reading:
'Atmosphere, Clouds, and Climate' (David Randall); 'Climate and the Oceans' (Geoffrey Vallis); 'The Global Carbon Cycle' (David Archer); 'Beyond Global Warming' (Syukuro Manabe)

Additional Reading Material:

Course/Module evaluation:
End of year written/oral examination 0 %
Presentation 0 %
Participation in Tutorials 10 %
Project work 30 %
Assignments 40 %
Reports 0 %
Research project 0 %
Quizzes 20 %
Other 0 %

Additional information: