



# *The Hebrew University of Jerusalem*

## *Syllabus*

### *AIR POLLUTION METEOROLOGY - 71608*

*Last update 21-12-2023*

*HU Credits: 3*

*Degree/Cycle: 1st degree (Bachelor)*

*Responsible Department: Soil and Water Sciences*

*Academic year: 0*

*Semester: 1st Semester*

*Teaching Languages: Hebrew*

*Campus: Rehovot*

*Course/Module Coordinator: Dr. Eran Tas*

*Coordinator Email: [Eran.Tas@mail.huji.ac.il](mailto:Eran.Tas@mail.huji.ac.il)*

*Coordinator Office Hours: By appointment*

*Teaching Staff:*

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Dr. Eran Tas,  
Ms. Nasreen ghanim

Course/Module description:

*Summary of thermodynamics and dynamics of the atmosphere: basic physical parameters and relationships, atmosphere composition, wet and dry air thermodynamics, physical forces and motion, buoyancy and stability.*

*Boundary layer and air pollutants dispersion: boundary layer structure, inversion, emission of pollutants from various types of emission sources (point, line, square..) and their dispersion in the atmosphere. Tools for estimating the necessary stack height.*

*Atmospheric chemistry and their interference with air-pollution: Different types of chemical processes in the atmosphere, atmospheric processes related to air pollution, removal and cleansing processes., aerosols and heterogeneous chemistry, clouds formation.*

*Air-pollution: air-pollution, combustion processes, air-pollutants and their influence on health and the environment, photochemical smog, air pollution in Israel and the rest of the world, atmospheric chemistry measurements, modelling chemical and physical processes in the atmosphere*

*Additional processes related to air-pollution: acid rain, global warming, reactive halogen species and the ozone hole, in the troposphere and stratosphere, atmospheric mercury deposition.*

*Reduction and control: ways to reduce air-pollution, monitoring, regulation and technological ways to reduce air-pollution.*

Course/Module aims:

*Getting familiar with the chemical and physical processes in the atmosphere with an emphasis on processes related to formation, transport and destruction of various air-pollutants. Acquiring tools for coping with these issues.*

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

*knowledge and tools for analyzing and monitoring processes related to the creation, transfer and dispersion of air pollutants*

*information on possible solutions to reduce the damage caused by exposure to air pollutants*

*ability to analyze the effects on a global scale, such as the ozone hole and global warming.*

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Attendance requirements(%):

80

*Teaching arrangement and method of instruction: Asynchronous lecture, synchronous work submission and presentation*

Course/Module Content:

*Thermodynamics and dynamics of the atmosphere, structure and physical properties of the atmosphere, atmospheric stability, thermodynamics of moist air and atmospheric stability, dispersion of air pollutants and combustion processes, kinetics of chemical processes in the atmosphere gas phase, and mixed phase, sources of air pollution and air pollutants and their effects on humans, animals, plants and the environment, sulfur compounds, nitrogen oxides, particles, photochemistry and creating the ozone, air pollution in the country, a policy reducing air pollution and technological, global warming and ozone destruction emphasis on stratospheric ozone*

Required Reading:

none

Additional Reading Material:

*-Jacob, Daniel J. Introduction to Atmospheric Chemistry, Princeton University Press, 1999*

*Finlayson-Pitts, Barbara J. and Pitts, James N. Chemistry of the upper and lower atmosphere, Academic Press, 2000*

*Seinfeld, John H. and Pandis, Spyros N. Atmospheric Chemistry and Physics - From Air Pollution to Climate Change, John Wiley & Sons, 2006*

Grading Scheme:

*Written / Oral / Practical Exam 80 %*

*Essay / Project / Final Assignment / Home Exam / Referat 20 %*

Additional information:

*The classes will be recorded and available on justified circumstances (military*

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*service, holidays, conflicts with other courses, parenthood and any other justified reason) or two weeks before the exam.*