ENV-400  
Air pollution and climate change  
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<th>Cursus</th>
<th>Sem.</th>
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<td>Energie et durabilité</td>
<td>MA2, MA4</td>
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<td>Energy Science and Technology</td>
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<tr>
<td>Sciences et ingénierie de l'environnement</td>
<td>MA2, MA4</td>
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Summary
A survey course describing the origins of air pollution and climate change

Content
- Atmospheric pollutants and their effects on the environment
- Emissions related to air pollution and climate change
- Measurements of air pollutants, greenhouse gases and meteorological conditions
- Air quality models
- Environmental regulations and abatement strategies related to air pollution and climate change

Keywords
Atmospheric chemistry, air quality, climate change, air pollution, meteorology, aerosols

Learning Prerequisites
Recommended courses
Physics and Chemistry of the Atmosphere (ENV-320)

Important concepts to start the course
- Differential, integral, and vector calculus
- Linear algebra
- Chemistry (reaction rates, chemical thermodynamics)
- Basic programming concepts

Learning Outcomes
By the end of the course, the student must be able to:
- Identify compounds recognized as pollutants and regulated in various countries
- Categorize emission or production sources and removal mechanisms of various pollutants.
- Compare methods and practical issues concerning measurement of gas, particles, and meteorological variables.
- Describe challenges in modeling atmospheric pollution/climate change phenomena.
Explain the dependence of air quality on emissions, meteorology, and atmospheric chemistry.

Assess / Evaluate the impacts of human activity on air pollution and climate change.

Describe potential mitigation strategies as possible solutions to air pollution/climate change problems.

Interpret atmospheric observations

Transversal skills

• Access and evaluate appropriate sources of information.
• Plan and carry out activities in a way which makes optimal use of available time and other resources.
• Assess one's own level of skill acquisition, and plan their on-going learning goals.

Teaching methods

Lectures and exercises (quantitative and programming)

Expected student activities

Lecture attendance, exercise assignments

Assessment methods

30% exercise assignments, 70% final exam

Resources

Bibliography

http://acmg.seas.harvard.edu/people/faculty/djj/book/

Ressources en bibliothèque

• *Fundamentals of Air Pollution Engineering* / Flagan
• *Physical Chemistry* / Atkins
• *Aerosol Technology* / Hinds
• *Air Pollution* / Wark
• *Chemistry of the Upper and Lower Atmosphere* / Finlayson-Pitts