Faculty of Technology and Science
Environmental and Energy Systems

Syllabus

Course Approval
The syllabus was approved by the Faculty Board of Technology and Science on 12 March 2014 , and is valid from the Spring semester of 2014 at Karlstad University.

Course Code: EMGA14
Environmental Chemistry, 7.5 ECTS Credits
(Miljökemi, 7.5 Swedish credit points)
Degree Level: Bachelor
Progressive Specialisation: G1F (First cycle, has less than 60 credits in first-cycle course/s as entry requirements)

Language of Instruction
Swedish or English, contact the course coordinator for further information.

Prerequisites
Upper secondary school level Mathematics D, Physics B, Chemistry A (field-specific eligibility 8) plus a basic A-level course 7.5 ECTS cr in environmental studies, for example, Energy and environmental engineering EMGA11 15 ECTS cr, or equivalent
OR
Upper secondary school level Mathematics 3c, Physics 2, Chemistry 1 (field-specific eligibility A8) plus a basic A-level course 7.5 ECTS cr in environmental studies, for example, Energy and environmental engineering EMGA11 15 ECTS cr, or equivalent
Basic environmental A-level course (7.5 ECTS Credits), for example, Environmental and Energy Engineering, basic course, 15 ECTS Credits (EMGA11), or the equivalent.

Major Field of Study
MEI (Environmental and Energy Systems)

Learning Outcomes

Upon completion of the course, students should be able to:
- give an account of the chemical processes of climate change, acidification, ozone conversion, and eutrophication
- demonstrate the ability to make probability assessments of the environmental effects of various emissions
- demonstrate skills in some common measurement methods in environmental analysis.

Content and Form of Instruction

The course is based on lectures with related classes and/or seminars, as well as calculation sessions. Measurement methods in environmental analysis are exercised in laboratory assignments and during a field trip.

Course content:
- Environmental chemistry as a practical tool. Correlations between different environmental problems. Using reaction rates and equilibrium constants in calculations in order to assess the significance of different reaction

pathways and to calculate substance concentrations. Equilibrium between gases and liquids (Henry's law).
- Stratospheric ozone - formation and degradation, natural and created catalysts, how ozone holes are formed.
- Tropospheric ozone - photochemical smog, the interaction of nitrogen oxides, ozone, hydrocarbons, and light, primary and secondary pollutions.
- Acidification - how nitrogen oxides and sulphur oxides react into acidifying substances, alkalinity, buffer systems.
- Climate change - greenhouse gases; absorption of heat radiation, the carbonate system, aerosols, GWP.
- Eutrophication - phosphate chemistry, microbiological processes regarding phosphorous and nitrogen, BOD, COD.

Reading List

See separate document.

Examination

Assessment is based on a written exam. Attendance in laboratory assignments and field trips is required.

Grades

One of the grades Fail (U), Pass (3), Some Distinction (4), or Distinction (5) is awarded in the examination of the course.

Quality Assurance

Follow-up relating to learning conditions and goal-fulfilment takes place both during and upon completion of the course in order to ensure continuous improvement. Course assessment is based on student views and experiences as reported in written course evaluations and/or group discussions. Students will be informed of the result of the evaluation and of the measures to be taken.

Course Certificate

A course certificate will be provided upon request.

Additional Information

Students who enrolled before 1 July 2007 will complete their studies in accordance with the requirements of the earlier admission. Upon completion students may request degree and course certificates to be issued under the current ordinance if they meet its requirements.

The local regulations for studies at the Bachelor’s and Master’s levels at Karlstad University stipulate the obligations and rights of students and staff.

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