Reg No: KTAD31/20241

Faculty of Health, Science and Technology
Chemical Engineering

Syllabus

Green Chemistry and Chemical Engineering

Course Code:	KTAD31
Course Title:	Green Chemistry and Chemical Engineering *Grön kemi och kemiteknik*
Credits:	7.5
Degree Level:	Master's level
Progressive Specialisation:	Second cycle, has only first-cycle course/s as entry requirements (A1N)

Major Field of Study:
KTA (Chemical Engineering)

Course Approval
The syllabus was approved by the Faculty of Health, Science and Technology 2023-08-29, and is valid from the Spring semester 2024 at Karlstad University.

Prerequisites
Registered for 140 ECTS credits in a Master programme in Engineering, with 30 ECTS credits in Chemistry and 30 ECTS credits in Chemical Engineering completed, or registered for 60 ECTS credits in Chemistry, with 30 ECTS credits completed, and 90 ECTS credits in Chemical Engineering, with 45 ECTS credits completed, plus upper secondary level Swedish 3 or Swedish as a second language 3 and English 6, or equivalent

Learning Outcomes
Upon completion of the course, students should be able to:
1. Give an account of and use the 12 principles for green chemistry,
2. Identify the need for knowledge of green chemistry to achieve increased societal sustainability,
3. Analyse, discuss, and give oral presentations on the conclusions of research literature in the field of green chemistry,

4. Use green chemistry and the 12 principles for green chemical engineering to develop safe industrial systems and processes without harming the environment or human health,
5. Identify ethical perspectives on the development of and research in green chemistry and chemical engineering in relation to the process or chemical engineering industry or activities,
6. Define cases for applying the principles of green chemistry and green chemical engineering in the process or chemical engineering industry,
7. Summarise research in scientific reports,
8. Present and defend scientific reports orally, and
9. Provide peer review of the scientific reports of others.

Content
Module 1, Green Chemistry, 3 ECTS cr
This module covers learning outcomes 1-3.
- The 12 principles of green chemistry
- The development and history of green chemistry
- Using green chemistry at the individual, societal, and international levels
Students use their knowledge of green chemistry to complete an individual assignment and present it in a report based on scientific reports and articles.

Module 2, Green Chemical Engineering, 4.5 ECTS cr
This module covers learning outcomes 4-9.
- The development and history of green chemical engineering
- The 12 principles of green chemical engineering
Students select a process or chemical engineering industry and discuss the principles of green chemistry and green chemical engineering in relation to the chosen industry or process, as well as industrial safety and ethical perspectives. The assignment is presented in a scientific report in accordance with instructions.

The course is based on teaching sessions where students are active and responsible for their own learning.

Reading List
See separate document.

Examination
Module 1, Green Chemistry, 3 ECTS cr
Assessment is based on an individual report presented and discussed in a seminar.

Module 2, Green Chemical Engineering, 4.5 ECTS cr
Assessment is based on an individual scientific report presented and defended orally in a seminar, and peer review of the work of another student.

If students have a decision from Karlstad University entitling them to Targeted Study Support due to a documented disability, the examiner has the right to give such students an adapted examination or to examine them in a different manner.

Grades
One of the grades 5 (Pass with Distinction), 4 (Pass with Some Distinction), 3 (Pass), or U (Fail) 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 evaluation is partly based on student views and experiences obtained in accordance with

current regulations and partly on other data and documentation. Students will be informed of the result of the evaluation and of any measures to be taken.

Course Certificate
A course certificate will be provided upon request.

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