

Syllabus

BIO876.1 Safe Nutrient Recycling, 10.0 credits

Säker näring i kretslopp

The course is given Environmental Pollution and Risk Assessment - Master's Programme, Agriculture Programme (admission before 1 July 2007), Natural Resources Programme - Biology and Soil Science, Soil and Water Management - Master's Programme and EnvEuro - European Master in Environmental Science and as course independent of study programme

Syllabus discontinued 14 March 2022

Version 1 in Slukurs. Corresponds to version 1, 2, 3, 4, 5, 6, 7, 8 and 9 in Ladok

Syllabus approved

14 November 2007

The version applies to students admitted from autumn 2008

The version is not a module version

Subjects

Biology/Environmental science

Education cycle

Second cycle

Modules

Title	Code	Credits
Single module	0101	10.0

Advanced study in the main field

Second cycle, has only first-cycle course/s as entry requirements (A1N)

Grading scale

5:Pass with Distinction, 4:Pass with Credit, 3:Pass, U:Fail

The requirements for attaining different grades are described in the course assessment criteria which are contained in a supplement to the course syllabus. Current information on assessment criteria shall be made available at the start of the course.

Language

English

Prior knowledge

Knowledge equivalent to English B from upper secondary school is required as from the academic year 2009/10.

Equivalent to 180 credits including at least 90 credits in one of the subjects Biology, Chemistry, Agricultural Science, Soil Science, Geo Science, Environmental Science or Technology. At least 10 credits in Biology and at least 10 credits in Chemistry must be included.

As an alternative to the above, equivalent to 120 credits including at least 20 credits in Biology, 20 credits in Chemistry and 20 credits in Soil Science. English skills equivalent to English A from upper secondary school.

Objectives

The course aims at giving the students an understanding of systems for the safe reuse of nutrients and organic matter contained in the biological waste and wastewater and the risks within the reuse system.

On completion of the course the student should:

- be able to describe the main sources of organic waste and wastewater in society and explain their different compositions and properties,
- be able to set criteria for management systems aiming at beneficial and safe use of the plant nutrients and organic content in waste and wastewater fractions,
- be able to describe the differences between aerobic and anaerobic treatment of solid and liquid waste at biological and process level
- be able to evaluate technologies and systems for composting, anaerobic digestion and onsite sanitation, including source-separating sanitation systems, regarding the microbial risk and environmental effect,

- be able to propose systems and processes which ensure that the waste-based fertilisers are well sanitized, and describe the factors that regulate the inactivation of pathogens
- be able to evaluate the results from different environmental systems analysis and microbial risk assessments,
- be able to efficiently communicate, orally and in writing, options for recycling systems for biological waste and wastewater and the related microbial risks connected to the system.

Content

The emphasis of the course is on biological treatment, safe sanitation, environmental evaluation and microbial risk assessment of recycling systems for biological waste and wastewater fractions. Amounts and composition of biological waste fractions are covered by literature and lectures. In literature, lectures, calculation exercises and study visits different aerobic and anaerobic processes for both waste and wastewater are covered, e.g. composting, digestion, soil infiltration, pond treatment. The microbiology, thermodynamics and process dynamics, dimensioning, emissions, resource use, hygiene and physical implementation of these processes are treated, as well as the agronomic value of resulting products. Other components of the recycling systems e.g. collection, distribution and spreading to the crop are also covered. Composting and anaerobic digestion is implemented in a laboratory exercise. Environmental systems analysis and microbial risk assessment is used to compare different recycling systems and practiced in a case study.

Implementation

Scheduled activities

Lectures ca. 35 h

Laboratory exercises – teacher led (compulsory) ca. 20 h

Computer exercises – (compulsory) ca. 10 h

Exercises – teacher led ca. 10 h

Project work – teacher led (compulsory) ca. 10 h

Study visits (compulsory) ca. 15 h

Introduction, questions, examination, evaluation ca. 10 h

Group activities outside the schedule

Exercises in group ca 40 h

Self studies outside the schedule

Self studies, report writing etc. ca 120 h
Sum 270 h

Formats and requirements for examination

Passed exams, passed reports, oral and written presentation of project work and attendance at the compulsory parts of the course.

- If the student fails a test, the examiner may give the student a supplementary assignment, provided this is possible and there is reason to do so.
- If the student has been granted special educational support because of a disability, the examiner has the right to offer the student an adapted test, or provide an alternative assessment.
- If changes are made to this course syllabus, or if the course is closed, SLU shall decide on transitional rules for examination of students admitted under this syllabus but who have not yet passed the course.
- For the examination of a degree project (independent project), the examiner may also allow the student to add supplemental information after the deadline. For more information on this, please refer to the regulations for education at Bachelor's and Master's level.

Transitional regulations

- Exams: At least three retake sessions (renewed exams) must be offered within two years of the decision to cancel the course.
- Compulsory elements: At least one opportunity for a retake session must be offered within two years of the decision to cancel the course.

Additional information

Overlap the course Biological Waste Recycling (TN0197).

- The right to take part in teaching and/or supervision only applies to the course date to which the student has been admitted and registered on.
- If there are special reasons, the student may take part in course components that require compulsory attendance at a later date. For more information on this, please refer to the regulations for education at Bachelor's and Master's level.

Responsible department

Department of Energy and Technology

Supplementary Information

Finalized by: Utskottet för naturvetenskapliga utbildningar, avancerad nivå (UNA)

Biology Area: Other Biology Courses

Course overlap: TN0197