Sveriges lantbruksuniversitet
Swedish University of Agricultural Sciences

SLUkurs

Syllabus

PNS0084 Advanced wastewater systems, 6.0 credits

Syllabus approved

2011-05-30

Subjects

Technology

Education cycle

Third cycle

Grading scale

Pass / Failed
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

Eligibility for third level education, i.e. completion of a second level qualification or having completed course requirements of at least 240 higher education credits, including at least 60 higher education credits at second level. Those who met the requirements for general eligibility before July 1st, 2007, i.e. have completed a programme of higher education for at least 180 Higher education credits or the equivalent are also eligible.

Knowledge of common mechanical, biological and chemical wastewater treatment processes corresponding to a 5 ECTS course is also required.

Objective, including learning outcomes

When passing the course, the student should know:
- the role of plant nutrients in society
- characteristics of wastewater fractions and how to utilize these by source separation
- how the risk of faecal – oral disease transmission can be managed
- development of more resource efficient wastewater processes using membranes
- development of more resource efficient wastewater processes using anaerobic technologies
- requirements and improvement potential of biological removal of phosphorus
- how pharmaceutical residues can be treated and degraded
- how nutrients from wastewater can be recycled as fertilizer to arable soil
- how control engineering can improve the efficiency of the wastewater treatment
- which sensors that can be used today and near future for controlling the wastewater processes
- the basis of how mathematical models for wastewater treatment processes are constructed and implemented and how computer simulations can be used for design and operation of treatment plants.

Content

Literature, lectures and discussions on:
- the function of plant macro nutrients for plants, the flow of these nutrients in society and political goals for these flows.
- composition and flows of wastewater fractions and how source separation utilizes these characteristics
- the faecal – oral route of disease transmission and how the risk of disease transmission can be managed
- how membranes are increasingly used for improved and resource efficient wastewater processes
- anaerobic technologies are increasingly used for more resource efficient wastewater processes
- biological removal of phosphorus
- treatment and degradation of pharmaceutical residues
- how nutrients from wastewater can be recycled to arable soil
- control engineering for improved wastewater treatment
- sensors used today and in the near future for controlling the wastewater processes

- how simulation models can be used for improving the wastewater treatment.

Computer simulations on different wastewater structures and on control strategies.

Requirements for examination

Passing grade on all handins and attending at least 50% of the scheduled time.

Additional information

This course is given in cooperation with:
Uppsala University, Department of Information Technology
Royal College of Technology, KTH, School of Architecture and the Built Environment
Mälardalen University, MDH, School of Sustainable Development of Society and Technology
Lund University, Industrial Electrical Engineering and Automation
Responsible department at SLU and over all responsible
Department of Energy and Technology, SLU

Responsible department

Department of Energy and Technology