

Arrival and departure, accommodations

The course takes place in Ås, Norway, 30 km south-southeast of Oslo. It is recommended that participants from outside Scandinavia arrive on Tuesday evening, June 12, when registration will be open from 1830-2145. It is also open 0800 - 1000 on Wednesday, June 13.

The final course session will be concluded at 1700 on Wednesday, June 20. Everyone is encouraged to participate in an afternoon-evening trip into Oslo, where we will see the famous Holmenkollen region and eat dinner together.

You may stay in a university dormitory or a hotel.

Prices pr. night:

Single room at the University Dormitory at Aas	NOK 450,-
Aas Hotel, single room (incl. Breakfast):	NOK 635,-

There are also floor spaces available in a classroom for free. You need to bring your own sleeping bag. Please contact us to reserve this.

Course fees and registration

NOK 5 000

(NOK 5 000; about US \$ 550 at the present exchange rate).

Includes course literature, trips during the course (excluding the Oslo trip on Thursday), and certain meals during the course.

First half or second half only is NOK 3 500.

Student rate: NOK 1 500,- for the week.

Registration on attached coupon, send to

Center for continuing education
Agricultural University of Norway
PO Box 5090

N - 1432 Aas, Norway

Phone (+47) 64 94 75 60 Fax (+47) 64 94 74 40

e-mail: sevu@adm.nlh.no

<http://www.nlh.no/sevu>

Registration deadline: May 08, 2001

Registration is final. A charge of half the course fees will be made for cancellations received later than 10 days before course start. Full course fees will be charged for non-attendance. An invoice for course fees will be sent with a confirmation of registration.

Questions on course content can be directed to
Prof. Petter D. Jenssen, Institute of Agricultural Engineering,
phone (+47) 64 94 86 85, e-mail: petter.jenssen@itf.nlh.no.

Questions concerning participation and accommodation contact
SEVU-NLH, phone (+47) 64 94 75 60, fax (+47) 64 94 74 40,
e-mail: sevu@adm.nlh.no

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ECOLOGICAL ENGINEERING FOR WASTEWATER TREATMENT

June 13 - 20, 2001
The Agricultural University of Norway, Aas



Institute of Agricultural Engineering

ECOLOGICAL ENGINEERING FOR WASTEWATER TREATMENT (01411)

Constructed wetlands and source separating systems

June 13 – 20, 2001

The Agricultural University of Norway, Aas

Scandinavia is at the forefront of developing environmentally safe methods for wastewater treatment, methods which are being applied both in European and more tropical countries. New technologies based on ecological principles reduces household water consumption by up to 50 %, nearly eliminates pollution, and produces a valuable plant fertilizer and soil amendment product. Biogas production is also possible.

The focus of the course is on systems using source separation, where the toilet fraction is separated from the wastewater stream and treated separately, and on wetland systems for treating graywater, combined wastewater, and landfill leachate. The source separating systems can also handle organic household waste and are applicable to rural and urban areas. Various options using urine separating, vacuum/low flush, and composting toilets will be covered, as well as the latest developments in design of graywater treatment systems.

There have been great improvements in recent years in the design of constructed wetland systems for wastewater treatment. The Agricultural University of Norway has concentrated especially on understanding their limitations and improving their performance in temperate and cold climates, but attention is also given to the use of wetland systems in warm/tropical climates.

Increasingly stringent requirements for treatment of wastewater from all sources, including small towns and rural areas, mean that demand is increasing for low-cost, effective alternatives. The course will give examples of ecologically engineered solutions appropriate for both high income and low income countries.

Lectures from leading Scandinavian researchers will give the background information necessary for successful system design, and you will go through exercises demonstrating appropriate design.

The course takes place only 10 km from the Oslo fjord, the week before midsummer, when the Norwegian night lasts only a couple hours. Trips to both the nearby fjord and the hills of Oslo will ensure that the week is not "all work and no play."

It is possible to sign up for the entire course or just the first three days or last three days.

Target group

The course is targeted to those who seek competence in sustainable technologies for wastewater treatment and those who work professionally or have an interest in learning about ecologically engineered systems. Professionals in consulting firms, municipal or state civil servants, and university students are welcome.

The course is held in English.

Goals

Present an overview of source separating and wetland systems: their advantages and disadvantages, their potential and limitations and general design features. You will also have participated in the design exercises, and will have an introduction to the economic and social issues surrounding their use.

Principal lecturers

- Carl Etnier, Scientist (economic and social issues), The Agricultural University of Norway. Editor of several books on Ecological Engineering.
- Björn Guterstam, Expert on aquatic systems for wastewater treatment.
- Petter D. Jenssen, Professor of Engineering, Internationally known expert on ecological engineering and leader for developing recycling and wetland systems in Norway.

- Trond Mæhlum, Senior scientist, The Norwegian Centre for Soil and Environmental Research. Wetland expert and pioneer of using wetland/pond systems for treatment of landfill leachate.
- Håkan Jönsson, Senior lecturer of Environmental Technology, The Swedish University of Agricultural Sciences, Scandinavia's leading expert on utilization of wastewater-based fertilizer products.
- Thor-Axel Stenström, Professor of Hygiene, Linköping University, international expert on hygiene, and advisor to the WHO.

Course schedule

Wednesday, June 13

An overview of wetland systems

- Subsurface flow constructed wetlands for treatment of household wastewater
- Natural systems for treatment of landfill leachate
- Extensive surface flow wetland systems in cold climate
- Wetland systems in warm temperate and tropical climate

Thursday June 14

Processes in wetland systems

- Removal of BOD, nitrogen, phosphorus, microorganisms and toxic compounds
- Microbial health risks
- Tour of full-scale wetland systems for treatment of wastewater and landfill leachate

Friday June 15

Design of systems

- Hydraulic and treatment considerations
- Economic and social considerations
- Exercises

Saturday June 16

For those who stay over the weekend there will be possible to sign up for a regional tour of historic and scientific interest.

Monday June 18

Introduction to recycling systems for wastewater treatment –

- The wastewater resource
- Toilet options, low flush, vacuum, composting, urine separating
- Vacuum collection of blackwater
- Cotreatment of blackwater and organic household waste, liquid composting, biogas production
- Greywater treatment and reuse
- Tour of "zero emission" apartment buildings

Tuesday June 19

Urine separating systems

- Agricultural use of organic derived fertilizer, application methods and yields
- Visit of liquid composting unit treating blackwater and organic household waste from the rural areas of a municipality

Wednesday June 20

- The toilet centers of Bangalore, India: a way to improve sanitation in slums
- Composting toilets
- Microbial health risks using recycling systems
- Economics, politics, and planning of systems. Final discussion.

Postage

SEVU-NLH
PO Box 5090
N-1432 Aas
Norway

Registration to course 01411

ECOLOGICAL ENGINEERING FOR WASTEWATER TREATMENT

Complete name _____

Institution _____

Address _____

Code _____ Town _____

Country _____

Daytime phone _____ Fax _____

Student? Yes

Register for the entire course June 13 -20

Register for June 13 - 15

Register for June 18 - 20

Accommodation:

University Dormitory

Aas Hotel

Classroom

Arrival _____ Departure _____

Date

Signature