

Level: Advanced level

**Approved by The Education Board for Education and Environment:
12/15/2011**

Overall educational goals

Degradation of water and water resources is a worldwide issue. Given the importance of water to human and ecosystem health as well as economy, an integrated approach is required if sustainable development is to be achieved.

**The overall education goals of this Programme are therefore to produce professionals who are able to:
simultaneously apply ecological and engineering principles in developing solutions that integrate human society with its natural environment, for the benefit of both;
play an important role in water and water related sectors, would it be with municipalities, government organisations or consulting firms – as well as in research or academic institutions; and
creatively work in a multidisciplinary and international environment.**

It is important to note that this Programme does not intend to make an "ecologist" out of an "engineer", or an "engineer" out of an "ecologist". It however explicitly ensures that each candidate deepens its water management skills by integrating key knowledge complementary to its own field of study, and by deepening its own professional competences.

Degree goals

Knowledge and Understanding

**For a Master's Degree (One Year) students must achieve
an ability to identify, define and discuss the potential impacts human activities have on the aquatic ecosystems from head-waters to the sea, at both local and basin wide levels.**

a capacity to identify, formulate and make a case for suitable prevention, mitigation and restoration approaches based on both ecological and engineering principles, taking into consideration socio-economical and public health issues.

a capacity to participate in the scoping, formulation and execution of a scientifically-based investigation seeking to address gaps in knowledge relevant to integrated water resources management.

Skills and Abilities

For a Master's Degree (One Year) students must achieve an ability to integrate interdisciplinary knowledge and handle complexity, as to formulate their own judgement and course of action in the development of- or analysis of- practical solutions of a water management problem, although information may be incomplete.

demonstrate an ability to independently identify and formulate issues and to plan and, using appropriate methods, carry out advanced tasks in the area of sustainable water management within specified time limits.

an increased ability to communicate effectively, individually and as a multidisciplinary team, with both specialist and popular audiences.

an ability to design and conduct experiments and subsequent analyzes and interpretation of data in both academic research environments and Research & Development.

Judgement and Approach

For a Master's Degree (One Year) students must achieve a deeper understanding of professional, societal and ethical responsibilities associated with sustainable water and water resources management and demonstrate an awareness of ethical aspects of research and development work.

demonstrate insight into the potential and limitations of science, its role in society and people's responsibility for how it is used.

demonstrate an ability to identify their need of further knowledge and to take responsibility for developing their knowledge.

Structure and content

This 1-year Programme is offered on a full-time basis to Bachelor graduates and mid-career professionals of either environmental or technical backgrounds interested in advancing their water management skills, as well as developing their capacity to work in a multidisciplinary and international environment.

Approach

All courses rely on a learning-by-doing and a problem solving approach to sustain the practical integration of knowledge and student's capacity to deal – individually and as a group – with the increasing complexity of the problems or situation presented. Each course is based on formal lectures and exercises (simulations, laboratories and field work), and use both

reading-based seminars and a problem-based project to promote critical thinking, capacity to operate in a multi-disciplinary environment, and confidence in presenting and defending one own ideas.

A creative and analytical (i.e., critical thinking) environment is sustained by a systematic use of real-life situations to illustrate and discuss principles or approaches (e.g., teaching material, data for exercises, issues and concerns for seminars and project). The programme draw heavily on its teachers expertise in both academic and consulting arenas, while their well established national and international research platforms form the backbone of the scientific environment in which students evolve (e.g., seminar series, guest lectures, participation to on-going research projects, specialized scientific literature).

Progression

Both course content/structure and the way courses are scheduled within the Programme ensure a steady broadening in knowledge, deepening of understanding, as well as strengthening of integration capacity and critical thinking. Each of the main building blocks of water resources management (principles, approaches and tools), initially explored under a more general perspective, are dealt with in increasing details and complexity as the student successively tackles each course specific topic. Similarly, requirements associated with self-sufficiency, communication skills and professional/societal/ethical responsibilities progressively increase within each course as well as between successive courses.

Structure

The first semester provides the students with the key elements of aquatic ecosystem functioning (incl. hydrology and hydraulics), the services they provide to society and how human activities impact them. Focus is on understanding the root-cause of these impacts and the underlying principles of prevention and mitigation measures. Hand-on experience of tools, techniques and approaches needed to undertake scientific assessment of freshwater aquatic ecosystems (incl. groundwater) is also provided. The first half of the second semester focuses on specific issues associated with the "water, energy and food security nexus" (reduce-reuse-recycle), while the second half is dedicated to the final Thesis Work.

Over the entire duration of the Programme, candidates are continuously supported in the development of their research abilities, information gathering and communication skills, in both written and multimedia forms.

The language of instruction and examination is English.

Within courses of this Programme, practical training (in Swedish: verksamhetsförlagd utbildning, VFU) is provided in the form of real-life projects, study-tours and field-studies that involve practitioners (e.g., municipalities, consulting firms).

Curriculum outline

Semester 1 (Fall)

Global Perspectives in Water Resources Management (Advanced level; 15 ECTS)

Limnology (Advanced level; 15 ECTS)

Semester 2 (Spring)

Ecological Sanitation (Advanced level; 7,5 ECTS)

Urban Waters Management (Advanced level; 7,5 ECTS)

Master Thesis in Sustainable Water Management (Advanced level; 15 ECTS)

Entry requirements

Bachelor of Sciences (BSc) or Bachelor of Engineering (BE) in subjects related to water or water resources, for example biology, environmental sciences, physical geography, civil engineering and environmental engineering and English B* or equivalent. *) English B is equivalent to - International English Language Testing Service (IELTS): an overall mark of 6.5 and no section below 5.5. - Test of English as a Foreign Language (TOEFL): Paper-based: Score of 4.5 (scale 1-6) in written test and a total score of 575; Internet-based: Score of 20 (scale 0-30) in written test and a total score of 90. - Cambridge ESOL: Certificate in Advanced English, Diploma of English Studies or Certificate of Proficiency.

Degree

Upon completion of this Programme, student receives a diploma entitled: Master of Science (60 credits) in Sustainable Water Management.

Supplementary education

Students can continue their education at the Master (2 years) and Doctoral level.

Decision

**Approved by The Education Board for Education and Environment:
12/15/2011. Valid from 9/3/2012.**

Programme evaluation

Programme evaluation is carried out according to the guidelines issued by the University.

Transitional rules

Should the programme be discontinued or significantly modified, students are entitled to follow the programme structure to which they were admitted. This opportunity is valid for 2 years after admission.

Admission 2013 week 36 Course Start End

Global Perspectives in Water Management 9/2/2013 1/19/2014

Global Perspectives in Water Management 9/2/2013 1/19/2014

Limnology for Water Management 9/2/2013 1/19/2014

Limnology for Water Management 9/2/2013 1/19/2014

Admission 2012 week 36 (Application code: HKR-12902) Course Start End

Master Thesis in Sustainable Water Management 4/1/2013 6/9/2013

Master Thesis in Sustainable Water Management 4/1/2013 6/9/2013

Urban Waters Management 2/25/2013 3/30/2013

Urban Waters Management 2/25/2013 3/30/2013

Ecological Sanitation 1/21/2013 2/24/2013

Ecological Sanitation 1/21/2013 2/24/2013

Global Perspectives in Water Management 9/3/2012 1/20/2013

Limnology for Water Management 9/3/2012 1/20/2013

Admission 2012 week 36 (Application code: HKR-12922) Course Start End

Master Thesis in Sustainable Water Management 4/1/2013 6/9/2013

Master Thesis in Sustainable Water Management 4/1/2013 6/9/2013

Urban Waters Management 2/25/2013 3/30/2013

Urban Waters Management 2/25/2013 3/30/2013

Ecological Sanitation 1/21/2013 2/24/2013

Ecological Sanitation 1/21/2013 2/24/2013

Global Perspectives in Water Management 9/3/2012 1/20/2013
Limnology for Water Management 9/3/2012 1/20/2013