Development of sustainable infrastructure

Civil engineers play a major role in developing infrastructures and supporting human development, while contributing to the sustainable development of society. Contamination of soil and water, lack of access to drinking water, and unsustainable use of land and water resources remain major obstacles while new challenges include threats from climate change and rapid urbanisation.
AIM OF THE PROGRAMME
Investments in infrastructure form a considerable part of the global economy. Hence sustainable development requires continued progress in civil engineering with a specialisation towards infrastructure and environment.

The programme aims at meeting the societal need for qualified competence in planning, design, construction and maintenance of infrastructure systems in soil and water, which will contribute to long-term sustainable development.

WHO SHOULD APPLY
Infrastructure and environmental engineering is an interdisciplinary field including traffic and road engineering, urban metabolism, water system engineering, engineering geology, geotechnical engineering, environmental engineering and sustainability and contaminated sites.

The programme welcome students interested in infrastructure integrated with environmental aspects, with a background in civil engineering, urban planning, environmental engineering or equivalent who fulfils the prerequisites of 20 cr in mathematics and statistics and who has some knowledge in engineering geology, hydrology, and applied environmental science.

WHY APPLY
The programme has a nationally and internationally unique profile as it deals with different aspects of infrastructure with integrated environmental and sustainability relevance. To prepare students for a long lasting professional career, the programme promotes personal development in comprehensive view of planning, construction and operation process; ability to work methodically and by means of modern engineering tools; ability to work in project teams, lead project work and present results; and the ability to critically review and develop technical solutions.

Integration of professional experience in education is an important part of the program and the student should be well prepared for entering the market in a professional role.

DOUBLE MASTER'S DEGREE
To promote exchange of students our programme has currently two agreements with foreign universities which enable a number of students to be awarded Master of Science degrees from two universities:
• Agreement with the international master’s programme Water Resources Engineering and Management (WAREM) at Universität Stuttgart (www.warem.uni-stuttgart.de).
• Nordic Master in Environmental Engineering (eNviroSTech) which is a consortium agreement between Aalto University (Finland), Chalmers (Sweden), Royal Institute of Technology, KTH (Sweden), Norwegian University of Science and Technology, NTNU (Norway) and Technical University of Denmark, DTU (Denmark).

RESEARCH CONNECTIONS
The courses have strong links to the research at the divisions of Water Environment Technology and Geoengineering at the Department of Civil and Environmental Engineering. During the master’s thesis project, students often participate in research projects and the Master’s programme has a natural continuation in the PhD programmes within the specialisations:
• Geotechnical Engineering
• Engineering Geology
• Sustainable Aquatic Systems, Water System Analysis and Water Process Technology
• Contamination and Remediation
• Urban metabolism

Research and teaching in the fields covered by the programme are carried out in close cooperation with industry and authorities such as major consultancies and industries in Sweden and abroad, as well as in municipalities. Cooperation is also conducted by several research centres: Infrastructure Competence Centre; FUD Swedish Network of Excellence in Road Planning and Design; FRIST: Forum for Risk Investigation and Soil Treatment; and DRICKS: Framework Programme for Drinking Water Research at Chalmers.

CAREER OPPORTUNITIES
Civil and environmental engineers with a strong background in both infrastructure and environmental engineering are sought
after and will also be in the future, both na-
nationally and internationally. In Sweden many large infrastructure projects are planned,
including roads and railways construction,
traffic planning, upgrading of drinking wa-
ter and wastewater plants, and handling of
contaminated sites. Adaptation to climate
change and urbanisation will increase the
need even further. Internationally there is
immense continued need for competent
engineers in this sector, both within but per-
haps even more outside Europe.

With a master’s degree from Infrastruc-
ture and Environmental Engineering you
will usually work with design, maintenance,
construction and research in the field of
civil and environmental engineering. Oth-
ers may attain supervisory or administrative
positions.

UNDERGRADUATE PROFILE
Major in Civil Engineering, Urban Planning,
Environmental Engineering or the equiva-
 lent.

PREREQUISITES
Mathematics 20cr (including Mathematical
statistics, Mathematical analysis in several
variables), Engineering geology, Hydrology
and Applied environmental science or the
equivalent. Preferable course experience:
Apart from the specific requirements, a
background in Hydraulic engineering and
Geotechnical engineering is a good base
for this programme.

ENGLISH LANGUAGE
PROFICIENCY
There are three main ways to fulfil English
proficiency requirements at Chalmers:
• Approved English language tests: IELTS
(academic training), 6.5 (with no
part of the test below 5.5), TOEFL (paper
based): 575 (with a minimum of 4.5 on the
written part), TOEFL (Internet based): 90
(with a minimum of 20 on the written part)
• English from upper secondary/high
school that meet requirements
• English from previous university studies
that meet requirements.

PROGRAMME PLAN
The programme comprises a compulsory
part, Overview and Basics, and a set of
elective courses, Tools, Depth and Syn-
thesis, followed by a Master’s thesis which
provides concluding specialisation and
research experience. The compulsory first
term (30 cr) provides a foundation in the
form of model thinking and design, water
resources management, as well as a back-
ground in urban development, such as drink-
ing water production and distribution and en-
geineering geology. A fundamental part of the
background is working with models.

In the Tools, Depth and Synthesis mod-
ule, the students, following their own
choices, can form a good basis for work-
ing in the field by specialising in road and
traffic, geo engineering, water systems,
or environment and sustainability (60 cr).
It is also possible to acquire a broad mix
in the field. The Master’s thesis includes
advanced work in one part of the field cov-
ered by the programme.

Information and application at
www.chalmers.se/en
CHALMERS UNIVERSITY OF TECHNOLOGY

Chalmers conducts research and education in engineering and natural sciences, architecture, technology-related mathematical sciences and nautical sciences – in close collaboration with industry and society. Chalmers is one of Sweden’s largest universities of technology with about 12,000 students and 2,200 employees.

Approximately 40 percent of Sweden’s graduate engineers and architects are educated here. Chalmers has formed partnerships with major industries mostly in the Gothenburg region such as Ericsson, Volvo and SKF.

The Master’s Programmes at Chalmers are strongly linked to advanced research in areas of particular strength. Upon completion of studies, candidates will be granted a Master’s degree. The programmes are taught in English and open to applicants from the whole world.

Chalmers has eight areas of advance where the aim is to bring together research, education and innovation across departmental boundaries and to co-operate with bodies and organisations outside Chalmers: Materials Science, Production, Information & Communication Technology, Transport, Built Environment, Nanoscience & Nanotechnology, Life Science and Energy. The eight key areas also have a firm foundation in the basic sciences. The pursuit of new knowledge and improved technology has characterized Chalmers ever since its foundation in 1829.

www.chalmers.se/en

THE SMALL METROPOLIS – GOTHENBURG

More than 60,000 are currently studying in Gothenburg. In many ways, their decision to choose Gothenburg when the time came to take the next step into the future isn’t surprising. Gothenburg is an attractive major city with a maritime atmosphere and within easy reach of outdoor activities in the rest of West Sweden.

Gothenburg is an uncommonly inviting city for students, with a great deal to offer: You’ll find an exciting cultural and entertainment scene worthy of any major city, as well as a friendly atmosphere that will help you to quickly feel at home.

Founded in 1621, Gothenburg is a young city by European standards. Since formative years it has been an important port of international trade and today it is the largest city in Scandinavia. With a population of about half a million, it is both friendly and cosmopolitan.

www.goteborg.com

SWEDEN – A CULTURE OF INNOVATION

One of the world’s most modern countries, Sweden is the birthplace of many successful international corporations. Innovative research at Swedish universities and companies has resulted in a number of successful inventions. Some examples are: the computer mouse, Bluetooth for internet mobility, the pacemaker, the ball bearing, the Tetra Pak beverage packaging system, the dialysis machine and internet applications such as the online music streaming service Spotify and the free internet calling service Skype. These fairly recent inventions build on a long history of excellence in academia and research. Sweden is the home of the prestigious Nobel Prize, awarded in Stockholm every year.

Sweden has a number of large multinational corporations, such as telecom supplier Ericsson, automotive companies Volvo and Scania, household appliances corporation Electrolux, bearing manufacturer SKF, and high-tech engineering groups Sandvik and Atlas Copco. The deep-rooted creative environment has made Sweden a strong nation in the areas of design, fashion and music, with well-known international brands such as furniture giant IKEA and clothes retailer H&M. Sweden is also one of the largest music-exporting countries in the world.

www.studyinsweden.se

“Chalmers – for a sustainable future is a vision which exudes the long-term approach, the acceptance of responsibility and the trust I feel is worthy of Chalmers. At the same time, it is obvious that this vision has to be shared by many and that Chalmers has to co-operate across disciplines in order to promote the whole of society’s commitment to our future.”

Karin Markides, president