



LUNDS UNIVERSITET
Lunds Tekniska Högskola

Course syllabus

Miljökunskap och vägbyggnad

Environmental Science and Road Construction

FMIA10, 10 credits, G1 (First Cycle)

Valid for: 2023/24

Faculty: Faculty of Engineering, LTH

Decided by: PLED W

Date of Decision: 2023-03-27

General Information

Compulsory for: L1

Language of instruction: The course will be given in Swedish

Aim

Road construction: aims to provide basic knowledge of roads in rural areas; about planning, design, construction, operation and maintenance.

Environmental science: Provide basic scientific knowledge of important environmental problems, as well as an introduction to how environmental problems are defined and treated in society, especially in connection with infrastructure projects.

Learning outcomes

Knowledge and understanding

For a passing grade the student must

- Be able to explain and use fundamental concepts within road construction.
- Read and understand the drawings that normally accompany a work plan and construction document for a road project, and
- Be able to outline the structure and characteristics of a flexible superstructure in a secondary road network.

- Have fundamental knowledge of the scientific mechanisms behind important environmental issues such as greenhouse effects, acidification, and ground-level ozone.
- Have general knowledge of important "environmental tools," such as LCA and EIA, and be able to relate these to real projects, especially in infrastructure construction and civil engineering.
- Have an overview of how society regulates environmental problems; i.e., the principles behind legislation, permits/monitoring, and policy instruments,
- Have an understanding of how businesses and organizations can relate to these principles through systematic environmental work, such as environmental management.

Competences and skills

For a passing grade the student must

- Be able to assess the appropriate design of a flexible superstructure according to Swedish standards.
- Give an overview of how the choice of road alignment affects road users and the environment.
- Identify relevant environmental issues associated with projects involving land use in a broad sense.
- Be able to perform an overview analysis of environmental impacts in such projects and thus identify additional expertise that needs to be called upon.
- In a formal report, account for important environmental aspects of a given land use project, based on road construction. The report should meet basic requirements for structure and reference management.
- Be able to orally communicate the content of such a report, as well as critically review and comment on the work of other students in the course.
- Independently gather information to solve specific tasks within the subject area.

Judgement and approach

For a passing grade the student must

- Comprehend the importance of systematic planning and implementation of roads and be able to interpret available information for road construction
- Have insight into the importance of a sustainable development and the particular responsibility of the engineer in relation to sustainable development

Contents

The course is divided into three parts, where lectures, laboratories, exercises and project assignments alternate.

Road construction: Planning and geometric design of roads, the construction of a road body and materials involved in construction and its properties, and methods or pavement design. Mixing different types of asphalt and how to prepare a recipe will be studied in the form of a laboratory. Exercises and laboratories are carried out in groups in form of a project work.

Environmental science: Important environmental problems related to the national environmental goals, and their importance in various sectors of society: agricultural industries, energy supply, transport systems and waste treatment. In particular, infrastructure construction in the form of road construction is treated. The environmental work of society and companies is treated and related to tools/methods, including anchoring in legislation.

The course's integrated project: This uses a life cycle perspective in the analysis of a road construction project, and must therefore include environmental consequences both in the construction and in the operational phase. It requires good structural design and correct report writing techniques, including source management and source criticism, and must result in a written report that is presented at special seminars. The project work must be based on acquired knowledge of both road construction and environmental science.

Examination details

Grading scale: TH - (U,3,4,5) - (Fail, Three, Four, Five)

Assessment: Passed written exam in both environmental science and road construction. Approved project tasks, which must be presented in writing and orally in seminar form. At these seminars, oral opposition must also be carried out. Participation in study visits. Compulsory lectures and smaller assignments that are reported separately may occur. The grade is based on the results from both exams (weighted equally). If it is necessary for a student with a permanent disability to be given an equivalent examination option compared to a student without a disability, the examiner can, after consultation with the university's department for pedagogical support, decide on an alternative form of examination for the student concerned.

The examiner, in consultation with Disability Support Services, may deviate from the regular form of examination in order to provide a permanently disabled student with a form of examination equivalent to that of a student without a disability.

Parts

Code: 0123. **Name:** Environmental Science.

Credits: 4. **Grading scale:** TH. **Assessment:** Written exam. Approved project work

Code: 0223. **Name:** Road Construction.

Credits: 4. **Grading scale:** TH. **Assessment:** Written exam. Approved project work

Code: 0323. **Name:** Project.

Credits: 2. **Grading scale:** UG. **Assessment:** Approved project work and approved oral presentation and oral opposition on another report

Admission

The number of participants is limited to: No

The course overlaps following course/s: VTT090, VTT091, VTVA01, VTVA05

Reading list

- Agardh, Sven; Parhamifar, Ebrahim: Vägbyggnad. Liber, 2014, ISBN: 978-91-47-09346-5.
- Ammenberg, J, Hjelm O, Eklund M, Gustafsson S & Ivner J: Miljöteknik: för en hållbar utveckling. Studentlitteratur AB, 2023, ISBN: 9789144159355. Latest edition.

Contact and other information

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