

Digitalization in construction

Digitalisering inom byggande

7.5 credits

Ladok Code: A551TA

Version: 1.0

Established by: Committee for Education in Technology 2026-05-29

Valid from: Autumn 2026

Education Cycle: Second cycle

Main Field of Study (Progressive Specialisation): Civil Engineering (A1F)

Disciplinary Domain: Technology

Prerequisites: Meets the requirements for admission to the Master's program in Resource Recovery specialization Sustainable Civil Engineering

Subject Area: Computer Technology

Grading Scale: Fail (U) or Pass (G)

Content

This course provides a practical introduction to digitalization in the construction sector, focusing on artificial intelligence (AI), statistical methods, and data-driven decision-making in civil engineering. Students learn to analyze data, develop and evaluate models, and apply tools such as Python, MINITAB, and Orange to solve real-world problems. Through hands-on exercises and a project, the course develops both technical skills and critical thinking for the application of AI in construction contexts.

Learning Outcomes

After completing and passing the course, students should be able to:

Knowledge and understanding

- 1.1 Explain fundamental concepts in AI and their applications to civil engineering projects
- 1.2 Describe processes for data collection, data preprocessing, and visualization
- 1.3 Account for statistical methods, including descriptive and inferential statistics as well as hypothesis testing
- 1.4 Explain principles of machine learning, including supervised and unsupervised learning

Skills and abilities

- 2.1 Analyze and process data, and perform statistical analyses
- 2.2 Develop and implement models for multi-criteria analysis using Python
- 2.3 Apply machine learning methods for classification, clustering, and image analysis
- 2.4 Evaluate and validate models with respect to performance and reliability
- 2.5 Apply the methods of the course in a project based on real-case civil engineering problems

Evaluation ability and approach

- 3.1 Assess and evaluate trained machine learning models
- 3.2 Assess the relevance and limitations of models in practical engineering applications
- 3.3 Reflect on the use of AI and data-driven methods in the construction sector from a decision-making and application perspective

Forms of Teaching

The course consists of lectures, and project work in groups.

The language of instruction is English.

Forms of Examination

The course will be examined through the following examination elements:

Project work with written report

Learning outcomes:

Credits: 4.5

Grading scale: Fail (U) or Pass (G)

Seminar with oral presentation

Learning outcomes:

Credits: 3

Grading scale: Fail (U) or Pass (G)

To receive the grade the student must pass all examination moments.

If the student has received a decision/recommendation regarding special pedagogical support from the University of Borås due to disability or special needs, the examiner has the right to make accommodations when it comes to examination. The examiner must, based on the objectives of the course syllabus, determine whether the examination can be adapted in accordance with the decision/recommendation.

Student rights and obligations at examination are in accordance with guidelines and rules for the University of Borås.

Literature and Other Teaching Materials

Student Influence and Evaluation

The course is evaluated in accordance with current guidelines for course evaluations at the University of Borås in which students' views are to be gathered. The course evaluation report is published and returned to participating and prospective students in accordance with the above-mentioned guidelines, and will be taken into consideration in the future development of courses and education programmes. Course coordinators are responsible for ensuring that the evaluations are conducted as described above.

Miscellaneous

This syllabus is a translation from the Swedish original.

The course is primarily intended for students in the Master Program in Resource Recovery – Sustainable Civil Engineering.

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