

Concrete technology and recycling Betongteknologi och -återvinning

7.5 credits

Ladok Code: A555TA

Version: 1.0

Established by: Committee for Education in Technology 2025-10-10

Valid from: Spring 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 programme in Resource Recovery specialization Sustainable Civil Engineering

Subject Area: Building Technology

Grading Scale: Seven-degree grading scale (A-F)

Content

The course focuses on providing students with knowledge and skills regarding concrete, our most widely used building material. Particular attention will be paid to the different material components of concrete: cement, aggregates, water, supplementary cementitious materials and admixtures. Students are prepared for in-depth knowledge of the properties of fresh concrete, aggregate properties, the properties of the hardened concrete and processes such as particle grading, proportioning, mixing, curing and testing of hardened concrete. The course covers practical methods for manufacturing, characterisation and material testing of concrete and thereby provides experimental skills. The course uses literature and cases, from which concrete is described in terms of sustainability and with a particular focus on the current state of knowledge in recycling concrete. The course also covers optimisation of concrete structures based on the environmental and circular sustainability of concrete.

Learning Outcomes

After completing and passing the course, the student will be able to:

Knowledge and understanding

- 1.1 describe the material components: cement, aggregates, water, supplementary cementitious materials and admixtures
- 1.2 describe processes regarding particle grading, proportioning principles, mixing, hardening and testing of concrete
- 1.3 describe the characteristics of fresh and hardened concrete
- 1.4 describe the links between sustainability, durability and technical performance requirements for concrete
- 1.5 describe the frontier of knowledge for research on concrete technology and recycling

Competence and skills

- 2.1 use existing frameworks, methods and tools for sustainable concrete production and recycling
- 2.2 demonstrate experimental skills for the production, characterisation and material testing of concrete
- 2.3 describe and discuss sustainable concrete production in society in writing and orally

Evaluation ability and approach

- 3.1 evaluate strategies for more sustainable concrete production
- 3.2 reflect on the importance of interprofessional collaboration for sustainable concrete production and recycling in a circular economy.

Forms of Teaching

The course consists of:

- Lectures
- Seminars
- Laboratory work

The language of instruction is English.

Forms of Examination

The course will be examined through the following examination elements:

Exam

Learning outcomes: 1.1-1.5, 2.1, 2.3, 3.1-3.2

Credits: 4

Grading scale: Seven-degree grading scale (A-F)

Project

Learning outcomes: 1.1–1.5, 2.1, 2.3

Credits: 1.5

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

Laborations

Learning outcomes: 2.2, 2.3

Credits: 2

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

The examination form “Examination” determines the final grade of the course, which is issued only when all components have been passed.

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

Soutsos M., Domone P.: Construction materials, Soutsos, M. & Domone, P., 2017. Construction Materials: Their Nature and Behaviour. 5th ed. Boca Raton: CRC Press. <https://doi.org/10.1201/9781315164595> or later edition

Additional literature and teaching materials are provided via the learning platform.

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

The course is a programme course for the Master's programme Resource Recovery – Sustainable Civil Engineering. The course is also offered to exchange students.