![University of Borås logo]

UNIVERSITY OF BORÅS

Construction Project
Konstruktionsprojekt
15 credits

Ladok Code: A329TG
Version: 1.0
Established by: Committee for Education in Technology 2024-02-23
Valid from: Autumn 2024

Education Cycle: First cycle
Main Field of Study (Progressive Specialisation): Mechanical Engineering (G2F)
Disciplinary Domain: Technology
Prerequisites: The following course must be completed in full: Mechatronics, 7.5 credits.
Subject Area: Mechanical Engineering
Grading Scale: Fail (U) or Pass (G)

Content

In this course, students will develop a completed mechatronic product prototype according to a given specification. The work is carried out in groups with a strict project organization. Central elements of the project include the use of AI and automation as the primary tools for the design process. The Python programming language is utilized to implement these technologies. The course also involves the use of Arduino as a tool to explore and implement electronic control systems in mechanical engineering applications. Additionally, 3D CAD is employed to support the construction project, where the design work is connected to the overarching goal. The project further incorporates additive manufacturing using 3D printers and prototype creation as key components of the process.

Another aspect of the project includes manufacturing, where both process and outcomes are central. Project work and project planning are integral to ensure progress and goal achievement. Students will also develop their academic writing and presentation skills. Information retrieval is an important part of the project to ensure relevant and up-to-date information is integrated into the work.

Learning Outcomes

Knowledge and Understanding
1.1 Describe principles and methods for effective project planning, including goal setting, time estimation, and resource management, to create well-structured and realistic project plans.
1.2 Explain fundamental concepts of machine learning and neural networks, such as training data, modeling, and prediction, and their applications in various engineering fields.
1.3 Account for 3D CAD technology as a tool for product development in mechanical engineering.
1.4 Explain the use of standard components and related product data in the design process.
Skills and Abilities
2.1 Apply 3D printing technology in practical construction projects within mechanical engineering.
2.2 Use 3D CAD models as the basis for illustrative elements in technical reports.
2.3 Communicate technical information professionally.
2.4 Manufacture prototypes using modern manufacturing methods.
2.5 Design and program a mechatronic system incorporating AI.
Evaluation and Judgment
3.1 Critically reflect on the choice of standard components and product data.
3.2 Critically reflect on technical decisions regarding appropriateness and efficiency.

Forms of Teaching

- Lectures
- Supervision

The language of instruction is Swedish. However, instruction in English may occur.

Forms of Examination

The course will be examined through the following examination elements:

Submission: Project planning and project management
Learning outcomes:
Credits: 2
Gradingscale: Fail (U) or Pass (G)

Prototyping
Learning outcomes:
Credits: 10
Gradingscale: Fail (U) or Pass (G)

Technical report
Learning outcomes:
Credits: 3
Gradingscale: Fail (U) or Pass (G)

Prototype development is assessed once per academic year when the course is offered.

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

Required Literature:
Tonnquist, B. (senaste upplagan). Projektledning från grunden. Sanoma utbildning

Recommended literature:
Backman, Jarl (senaste upplagan). Rapporter och uppsatser. 2., uppdaterade [och utök.]. uppl. Lund: Studentlitteratur

Svenska skrivregler. 3., [utök.] utg. (senaste upplagan). Stockholm: Liber

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 course is part of the Mechanical Engineering - Automation and AI program.
The specific entry requirements apply from Autumn 2024.