Applied Robotics for Architects
Tillämpad robotik för arkitekter

FRTN80, 7.5 credits, A (Second Cycle)

Valid for: 2025/26
Faculty: Faculty of Engineering LTH
Decided by: PLED F/Pi
Date of Decision: 2025-04-10
Effective: 2025-05-05

General Information

Main field: Digital Architecture and Emergent Futures **Depth of study relative to the degree requirements:** Second cycle, in-depth level of the course cannot be classified
Mandatory for: MAEF2
Elective for: A4
Language of instruction: The course will be given in English

Aim

The purpose of the course is to provide basic knowledge in industrial robotics where the theory is applied within architectural design processes. The course aims to provide an understanding of how robotics can be used for the production and maintenance of the built environment, as well as increase the ability to translate CAD models into robot programs for the production and manipulation of physical media, and how robots can contribute to the design process and sustainability.

Learning outcomes

Knowledge and understanding
For a passing grade the student must

- understand the characteristics of robots and their importance when used in industrial processes,
- understand how robotic systems can be designed for simulation and programming,
- understand how the design of a robot system affects an architectural design process.

Competences and skills
For a passing grade the student must

- model and simulate robotic systems,
- produce and present a design project made with robotic systems as tools,
- report, through oral and written argumentation, proposed solutions to problems posed.

Judgement and approach
For a passing grade the student must

- show ability to choose tools in relation to the architectural creation,
- show a critical attitude to how the tools affect the design process.

Contents

The course presents basic aspects of robotics for use in design processes and principally focuses on three problem areas: (1) modeling of robots, (2) programming and simulation of robots, and (3) designing robotic systems, for example focused on manufacturing systems with robots. The problem areas are defined more specifically before each course. Within the problem areas, as a rule, the following parts will be studied: properties and modes of operation with special emphasis on architectural use, programming and methods for calibration and simulation, modeling and analysis of robot structures, the robot's use in industry with adaptations and integration to processes, grips and tools, security, and peripherals. The course includes the following teaching elements:

- Lecture series focusing on the use of robots in construction and manufacturing processes as well as the project work that the students should carry out.
- Exercises with assignments to be completed highlighting modeling of robotic systems and issues linked to feedback and calibration (individual), and a project for designing robotic systems within a design task (in group).
- Laboration and study visit or guest lecturer.

Examination details

Grading scale: UG - (U, G) - (Fail, Pass)
Assessment: Approved project and exercise assignments as well as mandatory attendance at briefings.

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.

Modules
Code: 0123. **Name:** Applied Robotics for Architects.
Credits: 7.5. **Grading scale:** UG - (U, G).

Admission

Assumed prior knowledge: ASEF01 Programming for Architects.
The number of participants is limited to: 30
Selection: Completed university credits within the programme.
Priority is given to students enrolled on programmes that include
the course in their curriculum. Among these students priority is
given to those in the master's programme in Digital Architecture
and Emergent Futures, for whom the course is compulsory.
Kursen överlappar följande kurser: MMKF15 MMT150 FRTF20

Reading list

- Compendia and other material such as software and films are
  available on the Canvas page of the course.

Contact

Course coordinator: Björn Olofsson,
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Director of studies: Björn Olofsson, bjorn.olofsson@control.lth.se
Course homepage: https://canvas.education.lu.se/courses/37223

Further information

A student who has been offered a seat in the course must confirm
his/her participation within a week, or else the seat will be offered
to the next student according to the selection criteria.