



LUNDS UNIVERSITET
Lunds Tekniska Högskola

Course syllabus

Tillämpad robotik **Applied Robotics**

FRTN85, 7,5 credits, A (Second Cycle)

Valid for: 2023/24

Faculty: Faculty of Engineering, LTH

Decided by: PLED F/Pi

Date of Decision: 2023-04-18

General Information

Main field: Production and Materials Engineering.

Elective for: D4-mai, E4, F4, I4, M4-me, M4-prr, MD4, Pi4, MPRR2, MMSR2

Language of instruction: The course will be given in English

Aim

The purpose of the course is to give basic knowledge in industrial robotics where theory is applied on industrial applied problems. The purpose is to provide an understanding on how theory within the subject of the course can be applied in a practical way from an engineering point of view to create models for analysis, simulation and programming, and create solutions on problems which focus on efficient use of robots in industry.

Learning outcomes

Knowledge and understanding

For a passing grade the student must

- be able to understand characteristic features of robots and their significance when used in industrial processes
- be able to explain and use methods for modelling and analysis of kinematics of robots
- be able to model robot systems for simulation and modelling
- be able to design a robot system for (industrial) use with respect to given requirement specification
- be able to critically assess a design and the features of a robot system for use in an industrial setting.

Competences and skills

For a passing grade the student must

- be able to solve direct and inverse kinematics problems for a given robot structure
- be able to model a robot system and perform simulations and produce robot programs of the system
- be able to produce and present a design solution of a robot system for a given task
- be able to present, orally and in writing, suggested solutions on given tasks.

Contents

The course covers fundamental aspects of robotics for industrial use and focuses, in principle, on three problem areas: (1) Modelling of robots, (2) Programming and simulation of robots and (3) Design and development of robots in e.g. manufacturing systems. The problem areas are defined in more detail at the start of each course. Within the problem areas, the following will in general be studied: characteristic features of robots with emphasis on the use in industry, programming and methods used in calibration and simulation, modelling and analysis of robot structures, use of robots in industry with adaptation and integration to processes, end-effectors and tools, safety and peripherals. The following teaching elements are included:

- Lecture series with basic robotic concepts to be applied in exercises and project work.
- Exercises with handins for kinematic modelling of robots (individual), simulations and robot programming (individual), and a course project developing a robot system or robot application (in groups).
- Laboration and study visit or guest lecturer.

Examination details

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

Assessment: The course includes compulsory individual assignments and a course project performed in groups. To pass the course (grade 3) students need to successfully complete the assignments and the project. For higher grades (4 and 5), a written examination is also required.

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.

Admission

Assumed prior knowledge: FRTF05 Automatic Control, Basic Course

The number of participants is limited to: 60

Selection: Completed university credits within the programme. Priority is given to students enrolled on programmes that include the course in their curriculum.

The course overlaps following course/s: MMKF15, MMT150, FRTF20

Reading list

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

Contact and other information

Director of studies: Björn Olofsson, bjorn.olofsson@control.lth.se

Course coordinator: Björn Olofsson, bjorn.olofsson@control.lth.se

Course homepage: <https://www.control.lth.se/course/frtn85frtn80/>

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.