UNIVERSITY OF SKÖVDE

COURSE SYLLABUS

Autonomous Systems A1F

6 credits

Course code: VP718A
Version number: 7
Valid from: 1 July 2024
Ratified by: Curriculum Committee for Engineering Science
Date of ratification: 8 February 2024

1. General information about the course

The course is provided by the University of Skövde and is named Autonomous Systems A1F (Autonoma system A1F). It comprises 6 credits and is a second-cycle course. The level of progression is A1F.

The course is a part of the main field of study in Virtual Product Realization. The disciplinary domain of the course is Technology.

2. Entry requirements

A Bachelor's degree equivalent to a Swedish kandidatexamen of 180 credits, within the main fields of integrated product development, production engineering, automation engineering, mechanical engineering or information technology (or the equivalent) and passed courses VP702A Computational Intelligence A1N and VP711A Virtual Intelligent Machines A1N (or the equivalent).

A further requirement is proof of skills in English equivalent of studies at upper secondary level in Sweden, known as the Swedish course English 6. This is normally demonstrated by means of an internationally recognized language test, e.g. IELTS or TOEFL.

3. Course content

The course addresses autonomous systems in the context of production, factory environments and automation. Autonomy can exist in varying degrees in a system subject to the problem that is expected to be solved and it can also exist at various levels within the control software of a system. With this in mind the course will cover a range of example situations, algorithms and techniques related to autonomy. These topics may include the following: the meaning and definitions of autonomy and autonomous systems, types of sensors and their uses, types of robots and how they can be made autonomous, algorithms for Path planning/navigation and optimisation, algorithms for Collision avoidance, including feedback from sensors, algorithms for factory wide autonomy, virtual development of autonomous systems, implementation strategies for autonomous systems.

4. Objectives

Upon completion of the course, a student should have accomplished the following learning outcomes and be able to:

- explain the meaning of autonomy and how it relates to autonomous systems,
- define and discuss different levels of autonomy,
- evaluate the level of autonomy in a system,
- describe existing technologies (algorithms, sensors, robots, etc.) used for achieving autonomy,
- select and justify an appropriate level of autonomy for a future system,
- implement a program to control an autonomous system.

5. Examination

The course is graded A (Excellent), B (Very good), C (Good), D (Satisfactory), E (Sufficient) or F (Fail).

The examinations of the course consist of the following modes of assessment:

- **Lab assignment**
  2 credits, grades: G/U
- **Written report**
  4 credits, grades: A/B/C/D/E/F (determines the final grade)

Students with a permanent disability who have been approved for directed educational support may be offered adapted modes of assessment.

6. Types of instruction and language of instruction

The teaching comprises lectures, seminars and lab work. Group discussion features in all modes of delivery.

The teaching is conducted in English.

7. Course literature and other educational materials

The course literature consists of a set of chosen scientific articles and book chapters. A list of these are provided by the course director and are listed on the course home page for each time the course is given.

8. Student influence

Student influence in the course is ensured by means of course evaluation. The students are informed about the results of the evaluation and potential measures that have been taken or are planned, based on the course evaluation.

9. Additional information

Further information about the course, as well as national and local governing documents for higher education, is available on the website of the University of Skövde.