This course syllabus is discontinued or replaced by a new course syllabus.

ÖREBRO UNIVERSITY

Course Syllabus

School of Science and Technology

Computer Science, Advanced Project Work in Robotics and Intelligent Systems, Second Level, 30 Credits

Course Code:	DT4005	**Subject Area:**	Field of Technology
Main Field of Study:	Computer Technology	**Credits:**	30
		Subject Group (SCB):	Computer Science
Education Cycle:	Second Cycle	**Progression:**	A1F
Established:	2006-12-15	**Last Approved:**	2016-03-30
Valid from:	Autumn semester 2016	**Approved by:**	Head of School

Aims and Objectives

General aims for second cycle education

Second-cycle courses and study programmes shall involve the acquisition of specialist knowledge, competence and skills in relation to first-cycle courses and study programmes, and in addition to the requirements for first-cycle courses and study programmes shall
- further develop the ability of students to integrate and make autonomous use of their knowledge
- develop the students' ability to deal with complex phenomena, issues and situations, and
- develop the students' potential for professional activities that demand considerable autonomy, or for research and development work.

(Higher Education Act, Chapter 1, Section 9)

Course Objectives

Knowledge and understanding
The student shall after the completion of the course have:
- an increased understanding of the application of theories and methods to analyse and design intelligent systems,
- deep insights into current research and development work,
- explain basic concepts in artificial and mobile robot olfaction.

Applied knowledge and skills
Completing this course, the student will be able to:
- critically and systematically integrate knowledge and to analyse, evaluate and handle complexity even with incomplete or limited information,
- develop and review software for solving complex problems relating to mobile robot olfaction, and
- identify real-world situations and problems than can be formulated in relevant terms from computer science, and sketch useful solutions.

Making judgements and attitudes
Completing this course, the student will have an increased capability to:
- understand the computational and representational trade-offs associated with artificial and robot olfaction systems,
- study in a manner that may be largely self-directed or autonomous, and
- include reflections on social and ethical responsibilities linked to the application of their knowledge and judgements.

Main Content of the Course

The course consists of two mandatory sub-courses.

Sub-course I: Integrated project work, 22.5 credits
- methods within systems engineering for how to solve technical problems in a systematic and professional way,
- project work and project management,
- practical applications of theories and methods to analyze and synthesize intelligent systems, and
- overview of current research and development work.

More specifically, the course provides experience in employing state of the art algorithms, robots, and sensors for (respectively) reasoning (planning and/or scheduling), acting (executing actions with real robots and other actuators), and perception (including novel perception modalities such as artificial olfaction and perception in robotic systems in general). Special attention will be dedicated to the integration of algorithms, robots, sensors, and other sub-systems towards the aim of realizing complex intelligent systems.

Sub-course II: Mobile robot olfaction, 7.5 credits
- chemical sensing in nature,
- classical machine olfaction, closed sampling systems,
- mobile nose, open sampling systems,
- pattern analysis for the mobile nose,
- trail guidance and gas source localization,
- gas distribution modelling,
- airflow distribution modelling,
- gas source localization and gas distribution modelling.

Teaching Methods

he course consists of a supervised project work to be carried out in a group. Lectures, seminars, excursions and field work can be part of the course.

Students who have been admitted to and registered on a course have the right to receive tuition and/or supervision for the duration of the time period specified for the particular course to which they were accepted (see, the university's admission regulations (in Swedish)). After that, the right to receive tuition and/or supervision expires.

Examination Methods

Project Work in Intelligent Systems, 22.5 Credits. (Code: 0200)
The project work shall be presented as a written report, alternatively scientific paper published either at a conference or in a journal.

Mobile Robot Olfaction, 7.5 Credits. (Code: 0400)
Seminar. Oral presentation in one seminar is compulsory.

For further information, see the university's local examination regulations (in Swedish).

Grades

According to the Higher Education Ordinance, Chapter 6, Section 18, a grade is to be awarded on the completion of a course, unless otherwise prescribed by the university. The university may prescribe which grading system shall apply. The grade is to be determined by a teacher specifically appointed by the university (an examiner).

According to regulations on grading systems for first- and second-cycle education (vice-chancellor's decision 2010-10-19, reg. no. CF 12-540/2010), one of the following grades is to be used: fail, pass, or pass with distinction. The vice-chancellor or a person appointed by the vice-chancellor may decide on exceptions from this provision for a specific course, if there are special reasons.

Grades used on course are Fail (U), Pass (G) or Pass with Distinction (VG).

Project Work in Intelligent Systems
Grades used are Fail (U), Pass (G) or Pass with Distinction (VG).

Mobile Robot Olfaction

Grades used are Fail (U), Pass (G) or Pass with Distinction (VG).

The grade given for the course is the weighted average of the two subcourses.
ECTS Grading
The course grading is translated to the ECTS grading scale.

For further information, see the university's local examination regulations (in Swedish).

Specific entry requirements

At least 30 ECTS credits in computer science or automation on Second Level.

For further information, see the university's admission regulations (in Swedish).

Transfer of Credits for Previous Studies

Students who have previously completed higher education or other activities are, in accordance with the Higher Education Ordinance, entitled to have these credited towards the current programme, providing that the previous studies or activities meet certain criteria.

For further information, see the university's local credit transfer regulations (in Swedish).

Other Provisions

Teaching is in English.

Reading List and Other Teaching Materials

Part 2: Additional Reading

R Andrew Russell ISBN: 978-981-02-3791-2 / 978-981-4495-19-6 (ebook)
Odour Detection by Mobile Robots, World Scientific Publishing Company
232 pages

Tim C. Pearce (Editor), Susan S. Schiffman (Editor), H. Troy Nagle (Editor), Julian W. (2006)
Handbook of Machine Olfaction: Electronic Nose Technology
Gardner (Editor), ISBN: 978-3-527-60563-7, 624 pages