

School of Science and Technology

Reinforcement Learning, 3 Credits

Course Code:	DT105U	Subject Area:	Field of Technology
Main Field of Study:	Computer Science	Credits:	3
Education Cycle:	Second Cycle	Subject Group (SCB):	Computer Science
Established:	2019-02-06	Progression:	AXX
Valid from:	Spring semester 2019	Last Approved:	2019-02-06
		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

Completing this course, the student will know about the fundamental concepts in reinforcement learning, the different types of environments, the different types of reinforcement learning algorithms, and ways to choose and apply different basic reinforcement learning algorithms. Furthermore, the student will learn about ways to evaluate the performance of reinforcement learning systems.

Applied knowledge and skills

Completing this course, the student will be able to prepare data and apply reinforcement learning methods to achieve an objective with an intelligent reinforcement learning agent.

Making judgments and attitudes

Completing this course, the student will be able to judge the suitability of a reinforcement learning paradigm for a given problem and the available data, have an understanding of the capabilities and limitations of the considered reinforcement learning algorithms, and is able to identify problems or misleading results.

Main Content of the Course

Core concepts and algorithms used for reinforcement learning.

- Application of reinforcement learning algorithms.
- Types and formalization of environments.
- Basic reinforcement learning algorithms for finite and continuous action spaces.
- Practical recommendations for applying reinforcement learning algorithms.
- Evaluation and analysis of reinforcement learning algorithms.
- Additional topics: Markov property, experience replay, and state representation.

Teaching Methods

The course is designed as a distance learning course including classroom events. It consists of a series of online lectures, group discussions, obligatory self-study exercises and seminar presentations on a literature study and a project assignment.

Examination Methods

Exercises, 1.5 Credits. (Code: 0100)

Examination is done through written assignments.

Seminar Presentation, 1.5 Credits. (Code: 0200)

Examination takes place through presentation at seminar.

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) or Pass (G).

Exercises

Grades used are Fail (U) or Pass (G).

Seminar Presentation

Grades used are Fail (U) or Pass (G).

Other Provisions

The course is given in English.

Reading List and Other Teaching Materials

Required Reading

Ingen kurslitteratur krävs./No course literature is required.