COURSE SYLLABUS
Artificial Intelligence, 7.5 credits

Artificial Intelligence, 7,5 högskolepoäng

Course Code:	TARI29	**Education Cycle:**	Second-cycle level
Confirmed by:	Dean Mar 1, 2022	**Disciplinary domain:**	Technology
Revised by:	Director of Education Oct 25, 2023	**Subject group:**	DT1
Valid From:	Aug 1, 2024	**Specialised in:**	A1N
Version:	3	**Main field of study:**	Computer Science

Intended Learning Outcomes (ILO)

After a successful course, the student shall

Knowledge and understanding
- Display knowledge of search algorithms for production systems
- Display knowledge of formalisms for reasoning under uncertainty
- Show familiarity with game theory and its applications in AI

Skills and abilities
- Demonstrate the ability to apply production systems, and the accompanying search algorithms to various representations and problem instances
- Demonstrate the ability to develop programs in Prolog that handle the concepts addressed in the course, including constraint logic programming
- Demonstrate the ability to use resolution for inferencing in predicate and propositional logic
- Demonstrate the ability to Implement the Minimax algorithm, including some standard improvements
- Demonstrate the ability to implement algorithms for finding optimal policies in Markov decision processes

Judgement and approach
- Demonstrate an understanding of how representations and algorithms can be used for solving basic AI-problems described in a formal or informal way

Contents

The course is a basic course in artificial intelligence with a focus on traditional AI, i.e., GOFAI. The course covers many different basic and intermediate topics in the field, alternating theory with practice. After completing the course, the student shall have acquired a basic, but broad, knowledge in the field of artificial intelligence. Specifically, the student should understand and know how to apply all the theoretical concepts covered.

The main concepts included in the course are:

- Traditional AI: Problem representation, production systems, search with and without heuristics, planning, expert systems, automated reasoning, propositional logic, predicate logic, resolution
- Reasoning under uncertainty: Bayesian inferencing and other approaches
- Programming in Prolog: Basic syntax and semantics, lists, structures, recursion, ADT's, implementation of production systems and search algorithms. Constraint logic programming
- Intelligent agents: terminology, environments, different types of agents
- Basic game theory, the minimax algorithm, agents for game playing
- Agents for Markov decision processes

Type of instruction

The teaching in the course consists mainly of lectures, assignments and tutoring.

The teaching is conducted in English.

Prerequisites

The applicant must hold the minimum of a bachelor's degree (i.e the equivalent of 180 ECTS credits at an accredited university) with at least 90 credits in Computer Engineering, Computer Science or Electrical Engineering (with relevant courses in computer engineering), or equivalent, or passed courses at least 150 credits from the programme Computer Science and Engineering. The bachelor's degree should comprise a minimum of 15 credits in mathematics. Proof of English proficiency is required.

Examination and grades

The course is graded 5,4,3 or Fail.

The final grade for the course is based upon a balanced set of assessments. The final grade will only be issued after satisfactory completion of all assessments.

Registration of examination:

Name of the Test	Value	Grading
Examination	5 credits	5/4/3/U
Assignment	2.5 credits	5/4/3/U

Course literature

Literature
The literature list for the course will be provided 8 weeks before the course starts.

The Principal texts:

Title: Artificial Intelligence a modern approach, 3rd ed
Author: Russel, S. & Norvig, P.
Publisher: Pearson Education Ltd.
ISBN: 978-0132071482

Tile: PROLOG Programming for Artificial Intelligence, 4th ed

Author: Bratko, I.

ISBN: 978-0321417466