

## Cybernetics and Artificial Intelligence

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**Subject area:** Electrical Engineering

<b>University:</b>	CTU
<b>Level:</b>	BA2, BA3, BA4, MA all years
<b>Teaching mode:</b>	hybrid: some students participate online, other students attend real-life
<b>Instructor(s):</b>	Prof. Tomáš Svoboda, dr. Petr Pošík

### Short description

The course introduces the students into the field of artificial intelligence and gives the necessary basis for designing machine control algorithms. It advances the knowledge of state space search algorithms by including uncertainty in state transition. It introduced reinforcement learning for problems where the state transitions are unknown. Bayesian decision task introduces supervised learning. Learning from data is demonstrated on a linear classifier.

### Full description

<https://intranet.fel.cvut.cz/en/education/bk/predmety/43/58/p4358106.html>

### Learning outcomes

Students will learn and implement state-space search methods like (DFS, BFS, A\*), will learn and implement basic algorithms for adversarial search (minimax with alpha-beta pruning), will familiarize themselves with reasoning in Markov decision processes, and will apply basic reinforcement learning methods. Students will also learn and apply Bayesian decision making and will implement a linear classifier as an example of supervised learning.

### General information

<b>Contact hours per week:</b>	4
<b>Total workload:</b>	150 (in student hours for the whole course)
<b>ECTS credits:</b>	6
<b>Language:</b>	English

**Course start date:** 20 February 2023

- Course end date:** 28 May 2023
- Add. info about start date:** Start course date refers to starting date of semester at CTU. Schedules are available 1-2 weeks before semester starts.
- Weekly teaching day/time:**
- Time zone:** CET (Denmark, Germany, France, Netherlands, Switzerland, Czech Republic)
- Further information:** Lecture recordings will be available to students.
- Prerequisites:** The course expects basic knowledge of probability and linear algebra. We expect that students are able to write decent computer programs in a higher level language and have basic knowledge about data structures. Python will be used in computer labs.
- Activities and methods:** Lectures, Seminars, Self-study, Practices, Exercises, Tutorial sessions
- Presence on campus:**

## Final examination

- Form:** assignment and written exam
- Date:**
- Location/format:**
- Re-sit possibility:**
- Transcript available:** end of semester
- Add. info/requirements:**

## Registration

To register for this course, follow the registration requirements of your **home university** as specified here: [www.euroteq.eu/courses-registration](http://www.euroteq.eu/courses-registration).

## Administration

- Number of places:** 10
- Minimum participants:** The course will be opened in any case.
- Internal course code:** BE5B33KUI
- Contact:** petr.posik@cvut.cz

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*This course is part of the EuroTeQ Engineering University joint course catalogue 2023. This is a collaborative activity of the partner universities DTU, L'X, TU/e, TalTech, CTU, TUM as well as Technion. Students from these universities can participate in the offered courses. It is the responsibility of the student to check if you fulfil the requirements to participate in a specific course. Students are also advised to check with their home institution how to get recognition of the ECTS credits gained in courses of the EuroTeQ course catalogue. For further information about EuroTeQ Engineering University, visit [www.euroteq.eu](http://www.euroteq.eu) or get in touch with the above-mentioned point of contact.*