Exchange programme Vrije Universiteit Amsterdam

Vrije Universiteit Amsterdam - Exchange programme Vrije Universiteit Amsterdam - 2024-2025

Exchange

Vrije Universiteit Amsterdam offers many English-taught courses in a variety of subjects, ranging from arts & culture and social sciences, neurosciences and computer science, to economics and business administration.

The International Office is responsible for course approval and course registration for exchange students. For details about course registration, requirements, credits, semesters and so on, please visit the exchange programmes webpages.

Mind and Machine

Course Code	AB_1060
Credits	6
Period	P3
Course Level	300
Language Of Tuition	English
Faculty	Faculty of Science
Course Coordinator	dr. L.N. Cornelisse
Examiner	dr. L.N. Cornelisse
Teaching Staff	prof. dr. K. Linkenkaer Hansen, dr. L.N. Cornelisse
Teaching method(s)	Excursion, Study Group, Lecture, Computer lab

Course Objective

To introduce the students to the basic principles of brain modelling, artificial intelligence, and brain computer interfacing, discussing the practical applications as well as the ethical, moral, and philosophical aspects.

Specifically, at the end of the course the student should be able to:

1. explain the meaning of key concepts treated in the course and to give examples of where key concepts are already applied (services or products).
2. describe most commonly used forms of, as well as recent trends in, brain modeling, AI and BCI as discussed in the course.
3. reproduce the underlying principles of brain modelling, AI and BCI at the level discussed in the course.
4. develop, present and defend a business proposal, i.e., an idea for a product or service that exploits the technologies and concepts presented in the course.
5. formulate a scientifically informed opinion about the ethical aspects of AI and BCI.

Course Content

What is intelligence and what is unique about human intelligence? People have always been fascinated with the idea to create intelligent computers and robots and to integrate computers in the brain to enhance its performance. In recent years these technologies have become so advanced that they become more and more present in our daily live, from the personal assistant in your smart phone, to smart software in self-driving cars, to portable EEG headsets. Many see this as the start of a new era where smart machines will be completely integrated in our society, taking over many tasks and services now still done by humans. More dystopian views on the integration of human and machine are shown in science fiction films and series like Terminator 3 and Black Mirror. This has led to the realization that intelligence is not unique to humans but can exist in machines, and forces us to reflect on whether computers could ever reach or surpass human level intelligence, or merge with biological brains. , and if the brain can be of inspiration to improve Artificial Intelligence (AI).

In this course, the basic principles of brain inspired artificial intelligence, realistic computer simulations of the brain, and brain-computer interfacing (BCI) will be discussed. To investigate one of these topics in more detail students work in groups to start their own virtual start-up company and prepare a business proposal in which they describe a new commercial application of artificial intelligence or brain computer interfacing. The business project is presented to peers and a reviewer during a poster session at the end of the course. In addition, students will gain hands-on experience in computer practicals and an EEG-based neurofeedback competition, and discuss the ethical, moral, and philosophical aspects of artificial intelligence and brain-computer-interfacing.

Disclamer: this course is aimed at students without a background in computer science or AI. It will cover general concepts of AI and BCI, and their impact on society, rather than an in-depth discussion of all technological details.

Additional Information Teaching Methods

Lectures 35 hrs Practicals 8 hrs Business project 60 hrs

Method of Assessment

Exam 50%
Business project 40%
Discussion 10%

For all three sub-grades a grade ≥ 5.5 must be obtained. It is not possible to compensate.

Entry Requirements

This course is part of the minor Brain and Mind. University students need at least 90 ECTS to be eligible for (courses in) this minor. HBO students can follow (courses in) this minor if they have at least 120 ETCS.

Literature

To be decided

Additional Information Target Audience

- All students with an interest in the computational abilities of the brain and brain-inspired technology, that do not have a background in Artificial Intelligence or computer science.
- Due to curriculum overlap, students from Biomedical Sciences and Health and Life Sciences from the VU cannot follow this course.

Additional Information

- Part of minor Brain and Mind.
- This minor course requires a minimum of 25 participants to take place.

Central Academic Skills: Creative thinking to apply learned knowledge in the design and development of a product or service in the field of mind and machine. Reflecting on acquired knowledge during the course to discuss ethical and philosophical implications.

Recommended background knowledge

Two years of study at bachelor’s level. Basic knowledge of neurobiology.