



Course and Examination Fact Sheet: Autumn Semester 2026

7,230 | 8,230: Introduction to Machine Learning and Deep Learning

ECTS credits: 4

Overview examination/s

(binding regulations see below)

central - Written examination, Analog, Individual work individual grade (40%, 60 mins.)

Examination time: Lecture-free period

decentral - Software application, Digital, Group work individual grade (60%)

Examination time: Term time

Attached courses

Timetable -- Language -- Lecturer

[7,230,1.00 Introduction to Machine Learning and Deep Learning](#) -- English -- [Rodrigues Bruno](#)

Course information

Prerequisites

No prerequisites are required. Students will require a notebook for tutorials. A good background in mathematics, algorithms and data structures will be beneficial for this lecture.

Learning objectives

Understand AI, ML and DL, and how they fit together:

- Explain what Artificial Intelligence is, and how Machine Learning and Deep Learning sit within it
- Tell apart the main styles of learning (for example, learning from labelled examples versus finding patterns on its own) and recognise where each is useful
- Understand what makes AI *trustworthy*: why fairness, reliability, and knowing a model's limits matter

Grasp the core ideas behind the methods:

- Get an intuition for how a model *learns* from data, and how to tell whether it actually works
- Understand, without the heavy maths, what neural networks and deep learning are, and the kinds of problems they solve (images, text, sequences)

Put AI to work in practice:

- Turn an idea into a simple, working AI application
- Judge where AI adds real value in a product or business, and where it does not
- Present and explain an AI solution clearly to an audience without a technical background

Content

The rise of Artificial Intelligence (AI) driven by the breakthrough of Deep Neural Networks has disrupted many industries over the last years. Driven by large investment in research and development at tech companies such as Google, Meta and Amazon, the technology is turning into a key strategic element of every publicly listed company.

This lecture aims to introduce the concepts of Machine Learning (ML) and Deep Learning (DL) to the students. The goal is to provide an understanding of the basic concepts and approaches in both research areas, their relation to each other, and their



impact on business and society. In parallel to the lectures, students apply these concepts in a semester-long project: working in teams, they design, develop, justify, and present their own "AI-startup" business case.

Topics covered include:

- Machine Learning
- Importance of Data for Training
- Supervised learning
- Unsupervised learning
- Deep Learning and Neural Networks
- CNN, LSTM, Autoencoder, Transformers
- Trustworthy AI

Structure and indications of the learning and teaching design

Theoretical content presented in the lecture will be linked to practical applications in the lecture. In addition, discussions about recent AI development and innovation potential will connect the topic to real-world events.

While the exam will cover the theoretical aspects, a semester project that runs alongside the lectures (exercise sessions) will cover the practical aspects. Students form teams and develop a business case for an AI-driven product or service that they design, develop, justify, and present. The project has two assessed milestones:

- Mid-term presentation: problem, target users, proposed AI solution, data plan, and early progress.
- Final presentation/pitch: the full venture concept with a live demo of the working prototype.

Literature

- Course core reference: Goodfellow I., Bengio Y., Courville A., *Deep Learning*, MIT Press, 2016
- Accessible introduction: Agrawal A., Gans J., Goldfarb A., *Prediction Machines: The Simple Economics of Artificial Intelligence*, Harvard Business Review Press, updated ed. 2022

Additional information

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Examination information

Examination sub part/s

1. Examination sub part (1/2)

Examination modalities

Examination type	Written examination
Responsible for organisation	central
Examination form	Written exam
Examination mode	Analog
Time of examination	Lecture-free period
Examination execution	Synchronous
Examination location	On Campus
Grading type	Individual work individual grade
Weighting	40%
Duration	60 mins.



Languages

Question language: English

Answer language: English

Remark

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Examination-aid rule

Closed Book

The use of aids is prohibited as a matter of principle, with the exception of pocket calculator models of the Texas Instruments TI-30 series and, in case of non-language exams, bilingual dictionaries without any handwritten notes. Any other aids that are admissible must be explicitly listed by faculty members in the paragraph entitled "Supplementary aids" of the course and examination fact sheet; this list is exhaustive.

Procuring any aids, as well as ensuring their working order, is the exclusive responsibility of students.

Supplementary aids

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2. Examination sub part (2/2)

Examination modalities

Examination type	Software application
Responsible for organisation	decentral
Examination form	Practical test
Examination mode	Digital
Time of examination	Term time
Examination execution	Asynchronous
Examination location	On Campus
Grading type	Group work individual grade
Weighting	60%
Duration	--

Languages

Question language: English

Answer language: English

Remark

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Examination-aid rule

Open Book

Students are free to choose aids, apart from the following restrictions:

- pocket calculator models which are not part of the Texas Instruments TI-30 series, as well as any programmable electronic devices that are capable of communication such as electronic dictionaries, laptops, tablets, smartphones, headsets, additional screens, etc. are not admissible;
- there is an option for faculty members to explicitly define exceptions under supplementary aids.

Procuring any aids, as well as ensuring their working order, is the exclusive responsibility of students.

Supplementary aids



Teams of two students; teams of three only in justified exceptional cases. Each student receives an individual grade reflecting their contribution to the team's deliverables.

Content

All contents from lecture and exercise sessions, as well as referenced literature, on the following topics:

- Machine Learning
- Importance of Data for Training
- Supervised/unsupervised learning
- Deep Learning
- Neural Networks
- CNN, LSTM, Autoencoder, Transformers
- Trustworthy AI

Literature

- Provided lecture and exercise slides
- Exercise assignments
- Provided hand-outs
- Referenced literature
- Discussions during the lecture and exercise sessions

Please note

Please note that only this fact sheet and the examination schedule published at the time of bidding are binding and takes precedence over other information, such as information on StudyNet (Canvas), on lecturers' websites and information in lectures etc.

Any references and links to third-party content within the fact sheet are only of a supplementary, informative nature and lie outside the area of responsibility of the University of St.Gallen.

Documents and materials are only relevant for central examinations if they are available by the end of the lecture period (CW51) at the latest. In the case of centrally organised mid-term examinations, the documents and materials up to CW 43 (Friday, 23rd October 2026) are relevant for testing.

Binding nature of the fact sheets:

- Course information as well as examination date (organised centrally/decentrally) and form of examination: from bidding start in CW 34 (Thursday, 20th August 2026);
- Examination information (supplementary aids, examination contents, examination literature) for decentralised examinations: in CW 42 (Monday, 12th October 2026);
- Examination information (supplementary aids, examination contents, examination literature) for centrally organised mid-term examinations: in CW 43 (Friday, 23rd October 2026);
- Examination information (regulations on aids, examination contents, examination literature) for centrally organised examinations: two weeks before ending with de-registration period in CW 45 (Monday, 02nd November 2026).