

Module Description

39-Inf-ML_ver1 Introduction to Machine Learning

Faculty of Technology

Version dated Apr 4, 2026

This module guide reflects the current state and is subject to change. Up-to-date information and the latest version of this document can be found online via the page

<https://ekvv.uni-bielefeld.de/sinfo/publ/modul/26787799>

The current and valid provisions in the module guide are binding and further specify the subject-related regulations (German "FsB") published in the Official Announcements of Bielefeld University.

39-Inf-ML_ver1 Introduction to Machine Learning

Faculty

Faculty of Technology

Person responsible for module

Prof'in Dr. Barbara Hammer

Regular cycle (beginning)

Discontinued

Credit points

5 Credit points

Competencies

Non-official translation of the module descriptions. Only the German version is legally binding.

The students gain competences to analyse, formalize and treat a learning problem with appropriate methods and to judge algorithms with respect to their suitability for a given problem. In exercises, methods are applied to concrete and practical application problems, partially in form of programming tasks.

Content of teaching

The lecture introduces basic principles and theories of machine learning and formalizes learning problems. Fundamental mathematical and statistical methods are discussed and standard algorithms are presented including parameter estimation, Bayesian methods, linear approaches. Further topics are the basic notions of machine learning like training, test and validation, generalization, overfitting, model selection, regularization and the bias vs. variance dilemma.

Recommended previous knowledge

Knowledge as in the module 39-Inf-13

Necessary requirements

In den Masterstudiengängen "Data Science" und "BioMechatronik" gelten diese Voraussetzungen mit dem erfolgreichen Masterzugang als erbracht.

Vorausgesetzte Module:

39-Inf-1: Algorithmen und Datenstrukturen

24-M-INF1: Mathematik für Informatik I

24-M-INF2: Mathematik für Informatik II

Explanation regarding the elements of the module

The (partial) examination of the module can be performed as "ungraded" in some study programs at the students choice. Before the examination a respective determination must be carried out, a later modification (graded - ungraded) is impossible. If the "ungraded" option is chosen, it is not possible to include this module in a study program where this module is deemed to enter the calculation of the overall grade.

Module structure: 0-1 bPr, 0-1 uPr ¹

Courses

Title	Type	Regular cycle	Workload ⁵	LP ²
Grundlagen Maschinellen Lernens	exercise	WiSe	30 h (15 + 15)	1
Grundlagen Maschinellen Lernens	lecture	WiSe	60 h (30 + 30)	2 [Pr] [Pr]

Examinations

Allocated examiner	Type	Weighting	Workload	LP ²
Teaching staff of the course Grundlagen Maschinellen Lernens (lecture) <i>In einigen Studiengängen der Technischen Fakultät kann die Modulprüfung nach Wahl der Studierenden auch "unbenotet" erbracht werden (s. Erläuterungen zu den Modulelementen und die jeweilige FsB). Wird die unbenotete Option gewählt, ist es nicht möglich, dieses Modul zu verwenden, um es in einen Studiengang einzubringen, in dem dieses Modul bei der Gesamtnotenberechnung berücksichtigt wird. Erläuterungen zu dieser Prüfung siehe unten (benotete Prüfungsvariante).</i>	mündliche Prüfung o. Portfolio mit Abschlussprüfung	without grades	60h	2
Teaching staff of the course Grundlagen Maschinellen Lernens (lecture) <i>Portfolio of homework assignments accompanying the lecture, usually given weekly, and final written exam (60 min) or oral exam (15 min). The assignments complement and deepen the content of the lecture. Proof of a sufficient amount of correctly solved assignments (usually 50% of the maximum total score in the semester). The final exam covers the content of the lecture and the assignments.</i> <i>Or:</i> <i>oral examination (15-25 min.) about the contents of lecture and exercises</i>	mündliche Prüfung o. Portfolio mit Abschlussprüfung	1	60h	2

Further notices

Bei diesem Modul handelt es sich um ein eingestelltes Angebot. Ein entsprechendes Angebot, um dieses Modul abzuschließen, wurde bis maximal Wintersemester 2023/24 vorgehalten.

Bisheriger Angebotsturnus war jedes Wintersemester.

Legend

- 1 The module structure displays the required number of study requirements and examinations.
 - 2 LP is the short form for credit points.
 - 3 The figures in this column are the specialist semesters in which it is recommended to start the module. Depending on the individual study schedule, entirely different courses of study are possible and advisable.
 - 4 Explanations on mandatory option: "Obligation" means: This module is mandatory for the course of the studies; "Optional obligation" means: This module belongs to a number of modules available for selection under certain circumstances. This is more precisely regulated by the "Subject-related regulations" (see navigation).
 - 5 Workload (contact time + self-study)
- SoSe** Summer semester
- WiSe** Winter semester
- SL** study requirement
- Pr** Examination
- bPr** Number of examinations with grades
- uPr** Number of examinations without grades