# Introduction to Deep Learning

Summer

(in German: Introduction to Deep Learning )

## Module-ID: FIN-INF-120521

| Abbreviation | Credit Points | Semester | Term | Duration | Language | Level |
|---|---|---|---|---|---|---|
| IDL | 6 | Summer | starting at 1. | 1 Semester | english | Master |

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| **Link:** | LSF |
| **Limited accessability:** | true |
| **Responsibility:** | Sebastian Stober |
| **Lecturer:** | Sebastian Stober |
| **Classes:** | • Lecture *Introduction to Deep Learning*<br>• Exercise class *Introduction to Deep Learning* |
| **Applicability in curriculum:** | - M.Sc. INF: Informatik<br>- M.Sc. INGINF: Informatik<br>- M.Sc. WIF: Informatik<br>- M.Sc. DKE: Learning Methods and Models for Data Science<br>- M.Sc. DE: Methoden der Informatik<br>- M.Sc. VC: Computer Science |

**Intended learning outcomes:**
Students ...

- confidently apply DL techniques to develop a solution for a given problem

- follow recent DL publications and critically assess their contributions
- formulate hypotheses and design & conduct DL experiments to validate them
- document progress & design decisions for reproducibility and transparency
- have advanced competencies in scientific research in topics of the module

**Content:**

- Artificial neural network fundamentals (gradient descent & backpropagation, activation functions)
- Network architectures (Convolutional Neural Networks, Recurrent/Recursive Neural Networks, Auto-Encoders, Transformers)
- Regularization techniques
- Introspection & analysis techniques
- Optimization techniques
- Advanced training strategies (e.g. teacher-student)

**Workload:**

- 56h contact hours (2 SWS lecture + 2 SWS exercise groups)
- 124h self study (reading assignments (flipped classroom), programming exercises)

| Pre-examination requirements: | Type of examination: | Teaching method / lecture hours per week (SWS): |
|---|---|---|
| | Exam requirements: participation and active involvement in the course and the exercises (defined in the 1st lecture and published on the course website) Final exam: written (120 minutes) Schein: pass final exam (at least 4.0) | • Lecture (2 SWS)<br>• Exercise (2 SWS) |

| Prerequisites according to examination regulations: | Recommended prerequisites: |
|---|---|
| keine | Machine Learning (required) |

| Media: | Literature: |
|---|---|
| | Ian Goodfellow, Yoshua Bengio & Aaron Courville: "Deep Learning", MIT Press, 2016. |

**Comments:**

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