Foundations of Artificial Intelligence
A1. Organizational Matters

Malte Helmert

University of Basel

February 17, 2025

People
○○○○○

Format
○○○○○○

Assessment
○○○○

Tools
○○○

About this Course
○○○○○

Introduction: Overview

Chapter overview: introduction

- A1. Organizational Matters
- A2. What is Artificial Intelligence?
- A3. AI Past and Present
- A4. Rational Agents
- A5. Environments and Problem Solving Methods

People
●○○○○

Format
○○○○○○

Assessment
○○○○

Tools
○○○

About this Course
○○○○○

People

Teaching Staff: Lecturer

Lecturer

Prof. Dr. Malte Helmert

- email: malte.helmert@unibas.ch
- office: room 06.004, Spiegelgasse 1

People
○○●○○

Format
○○○○○○

Assessment
○○○○

Tools
○○○

About this Course
○○○○○

Teaching Staff: Assistant

Assistant

Dr. Florian Pommerening

- email: `florian.pommerening@unibas.ch`
- office: room 04.005, Spiegelgasse 1
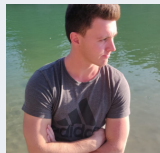
Teaching Staff: Tutors

Tutors

Remo Christen
- email: remo.christen@unibas.ch
- office: room 04.001, Spiegelgasse 5

Simon Dold
- email: simon.dold@unibas.ch
- office: room 04.001, Spiegelgasse 5

Claudia Grundke
- email: claudia.grundke@unibas.ch
- office: room 04.001, Spiegelgasse 5

Students

target audience:

- Bachelor Computer Science, ~3rd year
- Bachelor Computational Sciences, ~3rd year
- Master Data Science
- other students welcome

prerequisites:

- algorithms and data structures
- basic mathematical concepts
  (formal proofs; sets, functions, relations, graphs)
- complexity theory
- programming skills (mainly for exercises)

People
○○○○○

Format
●○○○○○

Assessment
○○○○

Tools
○○○

About this Course
○○○○○

Format

People
00000

Format
0●0000

Assessment
0000

Tools
000

About this Course
00000

Structure Overview

Foundations of AI week structure:

- Monday: release of exercise sheet
- Monday and Wednesday: lectures
- Wednesday: exercise session
- Sunday: exercise sheet due
- exceptions due to holidays

People
○○○○○

Format
○○●○○○○

Assessment
○○○○

Tools
○○○

About this Course
○○○○○

Time & Place

Lectures

- Mon 16:15–18:00 in Biozentrum, lecture hall U1.141
- Wed 14:15–16:00 in Biozentrum, lecture hall U1.141

Exercise Sessions

- Wed 16:15–18:00 in Biozentrum, SR U1.195
- Fri 10:15–12:00 in Spiegelgasse 1, room U1.001 (changed)

first exercise session: February 19 (this week)

Exercises

exercise sheets (homework assignments):

- mostly theoretical exercises
- occasional programming exercises

exercise sessions:

- initial part:
  - discuss common mistakes in previous exercise sheet
  - answer questions on previous exercise sheet
- main part:
  - we support you solving the current exercise sheet
  - we answer your questions
  - we assist you comprehend the course content

People
○○○○○

Format
○○○○○●○

Assessment
○○○○

Tools
○○○

About this Course
○○○○○

Theoretical Exercises

theoretical exercises:

- exercises on ADAM every Monday
- covers material of that week (Monday and Wednesday)
- due Sunday of the same week (23:59) via ADAM
- solved in groups of at most two ($2 = 2$)
- support in exercise session of current week
- discussed in exercise session of following week

People
○○○○○

Format
○○○○○●

Assessment
○○○○

Tools
○○○

About this Course
○○○○○

Programming Exercises

programming exercises (project):

- project with 3–4 parts over the duration of the semester
- integrated into the exercise sheets (no special treatment)
- solved in groups of at most two $(2 < 3)$
- implemented in Java; need working Linux system for some
- solutions that obviously do not work: 0 marks

People
○○○○○

Format
○○○○○○

Assessment
●○○○

Tools
○○○

About this Course
○○○○○

Assessment

People
○○○○○

Format
○○○○○○

Assessment
○●○○

Tools
○○○

About this Course
○○○○○

Course Material

course material that is relevant for the exam:

- slides
- content of lecture
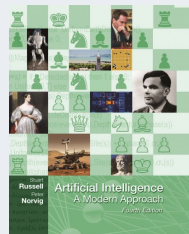- exercise sheets

additional (optional) course material:

- textbook
- bonus material

Textbook

Artificial Intelligence: A Modern Approach
by Stuart Russell and Peter Norvig
(4th edition, Global edition)

- covers large parts of the course
  (and much more), but not everything

People
○○○○○

Format
○○○○○○

Assessment
○○●○

Tools
○○○

About this Course
○○○○○

Exam

- written exam on Wednesday, July 2
    - 14:00-16:00
    - 105 minutes for working on the exam
    - location: Biozentrum, lecture hall U1.131
- 8 ECTS credits
- admission to exam: 50% of the exercise marks
- class participation not required but highly recommended
- no repeat exam

Plagiarism

Plagiarism (Wikipedia)

Plagiarism is the "wrongful appropriation" and "stealing and publication" of another author's "language, thoughts, ideas, or expressions" and the representation of them as one's own original work.

consequences:

- 0 marks for the exercise sheet (first time)
- exclusion from exam (second time)

if in doubt: check with us what is (and isn't) OK before submitting

exercises too difficult? Join the exercise session!

People
○○○○○

Format
○○○○○○

Assessment
○○○○

Tools
●○○

About this Course
○○○○○

Tools

Course Homepage and Enrolment

Course Homepage

```
https://dmi.unibas.ch/en/studium/
computer-science-informatik/lehrangebot-fs25/
13548-lecture-foundations-of-artificial-intelligence/
```

- course information
- slides
- bonus material (not relevant for the exam)
- link to ADAM workspace

enrolment:

- `https://services.unibas.ch/`

Communication Channels

Communication Channels

- lectures and exercise sessions
- ADAM workspace (linked from course homepage)
  - link to Discord server
  - exercise sheets and submission
  - exercise FAQ
  - bonus material that we cannot share publicly
- Discord server (linked from ADAM workspace)
  - opportunity for Q&A and informal interactions
- contact us by email
- meet us in person (by arrangement)
- meet us on Zoom (by arrangement)

People
○○○○○

Format
○○○○○○

Assessment
○○○○

Tools
○○○

About this Course
●○○○○

About this Course

People
○○○○○

Format
○○○○○○

Assessment
○○○○

Tools
○○○

About this Course
○●○○○

Classical AI Curriculum

"Classical" AI Curriculum

1. introduction

2. rational agents

3. uninformed search

4. informed search

5. constraint satisfaction

6. board games

7. propositional logic

8. predicate logic

9. modeling with logic

10. classical planning

11. probabilistic reasoning

12. decisions under uncertainty

13. acting under uncertainty

14. machine learning

15. deep learning

16. reinforcement learning

⤳ wide coverage, but somewhat superficial

Our AI Curriculum

Our AI Curriculum

1. introduction

2. rational agents

3. uninformed search

4. informed search

5. constraint satisfaction

6. board games

7. propositional logic

8. ~~predicate logic~~

9. ~~modeling with logic~~

10. classical planning

11. ~~probabilistic reasoning~~

12. ~~decisions under uncertainty~~

13. acting under uncertainty

14. ~~machine learning~~

15. ~~deep learning~~

16. ~~reinforcement learning~~

Topic Selection

guidelines for topic selection:

- fewer topics, more depth
- more emphasis on programming projects
- connections between topics
- avoiding overlap with other courses
  - Pattern Recognition (B.Sc.)
  - Machine Learning (M.Sc.)
- focus on algorithmic core of model-based AI

People
○○○○○

Format
○○○○○○

Assessment
○○○○

Tools
○○○

About this Course
○○○○●

Under Construction. . .

- A course is never "done".
- We are always happy about feedback, corrections and suggestions!