

Study material for the course

E016350A - Artificial Intelligence (2024-2025)

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The table below gives an overview of the study material. The corresponding parts from the suggested book (see the references below) are written next to each item. The **slides** cover all the material that will be tested in the exam. Most of the theory lectures are accompanied by **exercises** and for some comprehensive **lecture notes** and/or tutorials in the form of Jupyter notebooks (IPYNB) are available as well. These are meant to facilitate studying and deeper understanding of the material presented in the theory slides. Optional material includes video recordings from previous years, for the parts of the course that align well with those previous editions. The suggested reference material provides you extra explanation, wider context and deeper insight.

Lectures (slides)	Lecture Notes/Tutorials	Exercise	Video	Lab	Ref. material
1 Introduction					[R&N], Ch.1
2 Supervised learning	Supervised learning	☒			[R&N], Ch.19
3 Logistic Regression	Logistic regression Nonlinear features Multiclass linear	☒		Lab1	[R&N], Ch.19
4 Decision trees	Decision trees	☒		Lab2	[R&N], Ch.19
5 Neural networks Part1		☒		Lab3 HW1	[R&N], Ch.21
6 Neural networks Part2				P1	[R&N], Ch.21
7 White-box vs. black-box ML		☒			[R&N], Ch.19
8 Probabilistic reasoning		☒	☒		[R&N], Ch.12
9 Bayesian networks		☒	☒		[R&N], Ch.13
10 Inference in Bayes' nets		☒	☒		[R&N], Ch.13
11 Bayesian machine learning	Learning probabilist. models				[R&N], Ch.20
12 Unsupervised learning	IPYNB Tutorials: Clustering; PCA; Kmeans&GMM				[Ng&Ma], Ch.10, Ch.12
13 Intelligent agents Search strategies		☒	☒	Lab4 HW2	[R&N], Ch.2 [R&N], Ch.3
14 Game playing		☒	☒		[R&N], Ch.5
15 Reasoning over time		☒	☒		[R&N], Ch.14
16 Rational decisions		☒	☒		[R&N], Ch.16
17 Markov decision processes		☒	☒		[R&N], Ch.17
18 Reinforcement learning		☒	☒	P2	[R&N], Ch.22

Table 1: Overview of the study material. All the material except for the referred book chapters is available on Ufora.
HW denotes homework assignment and P projects.

References

[R&N] S. Russel and P. Norvig, *Artificial Intelligence: A Modern Approach*, (Fourth Edition), Prentice Hall, 2021.

[Ng&Ma] Andrew Ng and Tengyu Ma: *Lecture Notes Machine Learning CS229*, 2023.
https://cs229.stanford.edu/main_notes.pdf