

Fakultas Ilmu Komputer Universitas Indonesia

Course Outline

CSCE802141 **Teori Komputasi Lanjut**

(Advanced Theory of Computation)

Semester I 2021/2022

Lecturer:

L. Yohanes Stefanus -- yohanes@cs.ui.ac.id

Description:

The topic of this course varies from semester to semester, according to the current trends.

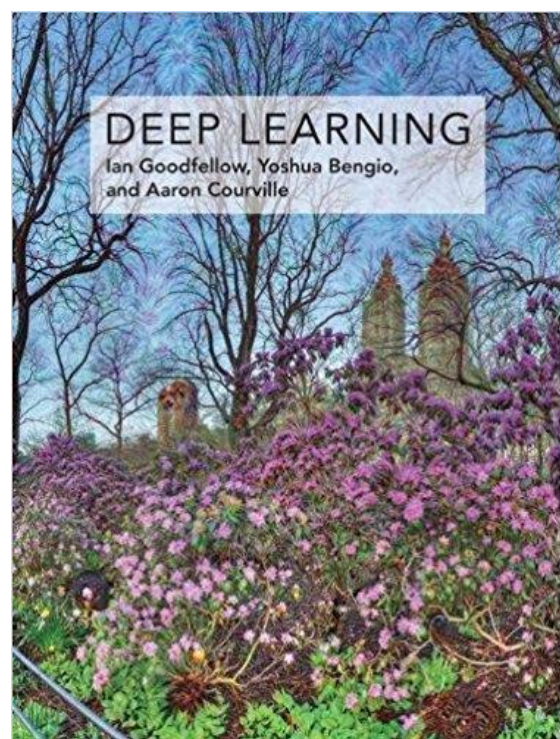
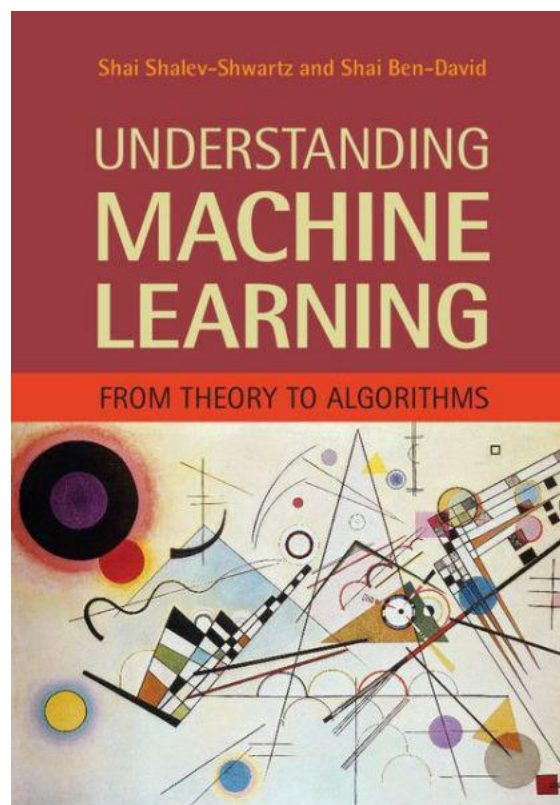
For this semester, the topic is about **Theory of Machine Learning**.

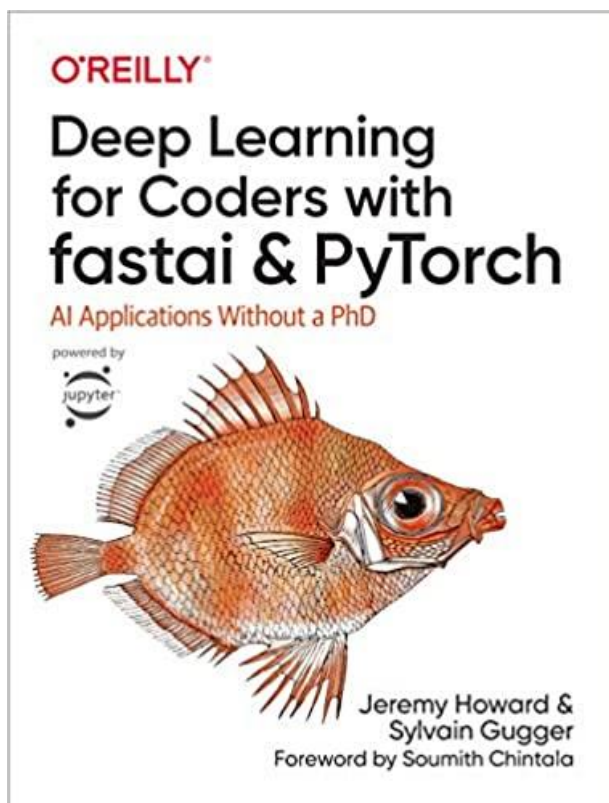
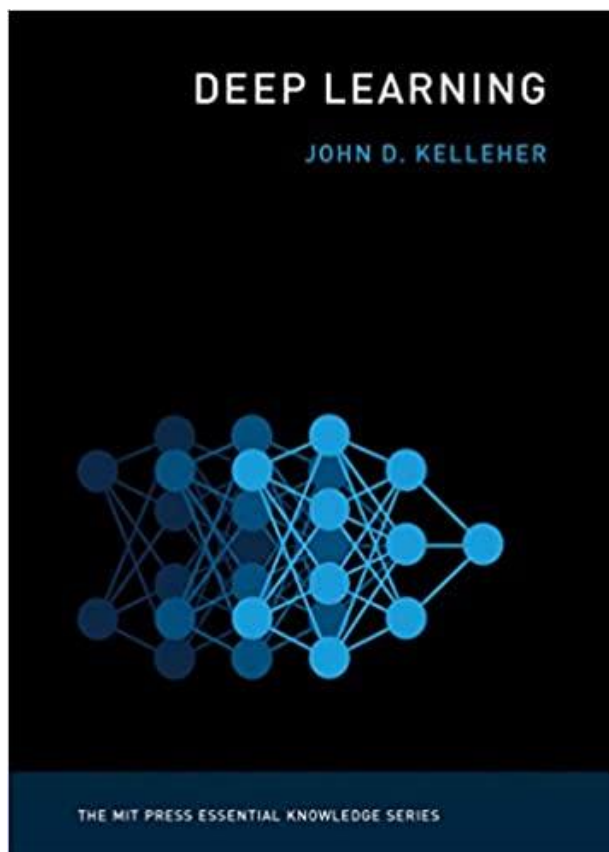
This course provides a theoretical account of the fundamental ideas underlying machine learning and the mathematical derivations that transform these principles into practical algorithms.

This course also includes a mathematical discussion of convolution and the computational complexity of learning.

References:

1. Shai Shalev-Shwartz and Shai Ben-David. **UNDERSTANDING MACHINE LEARNING: From Theory to Algorithms**. Cambridge University Press, 2014.
2. Ian Goodfellow and Yoshua Bengio and Aaron Courville. **DEEP LEARNING**. MIT Press, 2016.
3. John D. Kelleher. **Deep Learning**. MIT Press, 2019.
4. Jeremy Howard and Sylvain Gugger. **Deep Learning for Coders with fastai and PyTorch**. O'Reilly Media, 2020.
5. Current scientific papers on machine learning.





Prerequisites:

- Discrete Mathematics
- Linear Algebra
- Statistics & Probabilities
- Algorithm Design & Analysis
- Artificial Intelligence

Credit units: 4 sks

Lecture schedule:

Monday, 08.00-09.40 @ 2.2401

Wednesday, 08.00-09.40 @ 2.2401

Course webpage: <https://scele.cs.ui.ac.id/course/view.php?id=3258>

Evaluation Components:

- 20% seminar [Students give a comprehensive presentation about a chosen topic.]
- 20% homework
- 20% survey paper (10 -- 20 pages). [Students write a review paper about a chosen topic from current journal/conference papers.]
- 40% final exam

Academic Rules

- **If you cheat on an exam or assignment, you will get a final mark of E.**
- The goal of assignments is to give you practice in mastering the course material.
- Assignments are to be done individually. Discussing problem-solving strategies with other students is encouraged.
- You must write up each problem solution or program by yourself without assistance, even if you collaborate with others to solve the problem. You are asked on your assignment hand-in to identify your collaborators. If you did not work with anyone, you should write "Collaborators: none". If you obtain a solution through research (e.g., on the world wide web), acknowledge your source, but write up the solution in your own words.
- Under no circumstances should you share your written solution with another student. Simply showing your written solution to another student is considered as cheating or violation of academic integrity.
- Plagiarism and other anti-intellectual behavior cannot be tolerated in any academic environment.

Class Rules

- **PC/Laptops and Cellphones in Class:**
Use of laptops is permitted during class. Cell phones and other technological devices are to be silenced during class.
- **Class Attendance:**
It is expected that you will arrive on time and attend every class. If you need to miss a class due to an emergency, it will be your responsibility to obtain missed notes and course announcements from another student.