

# Machine Learning: Theory, Fairness, Privacy

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# Outline

# Course material

## Books

- ▶ Introduction to Statistical Learning with Python

[https://hastie.su.domains/ISLP/ISLP\\_website.pdf](https://hastie.su.domains/ISLP/ISLP_website.pdf)

- ▶ The algorithm foundations of differential privacy

<https://www.cis.upenn.edu/~aaroht/Papers/privacybook.pdf>

- ▶ Machine learning in science and society (draft)

<https://github.com/olethrosc/ml-society-science/blob/master/book.pdf>

## Course github

- ▶ <https://github.com/olethrosc/machine-learning-neuch>

# Course structure

## Class time

- ▶ Lectures with demos
- ▶ Lab practice
- ▶ Group work

## Assessment

- ▶ Assignments (20%)
- ▶ Group project (40%)
- ▶ Exam (40%)

## Communication

- ▶ Forum for technical questions
- ▶ Email for personal questions
- ▶ Office hours Friday 13:15-14:00 (by appointment)

# Course contents

## Theory

- ▶ Estimation
- ▶ Learning and generalisation

## Algorithms and Models

- ▶ Bayesian networks and Bayesian inference
- ▶ Neural networks and stochastic gradient descent

## Fairness

- ▶ Group: Equality
- ▶ Individual: Meritocracy

## Privacy

- ▶ Anonymity
- ▶ Differential privacy