# Syllabus – MICRO 110 Spring 2025

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Lectures:

- Room C01
- Pre-recorded videos from previous years will be made available at: https://mediaspace.epfl.ch/channel/MICRO-110+Design+of+experiments/
- at the end of each week. These are intended to serve as reference videos for you to use, as a backup to the in-class lectures. You will be responsible for all material covered in class.
- I will also be recording videos from CO1 and making them available each week

Exercises:

- Weeks with merged lectures / exercises: CO1
  - Lecture will be interspersed with exercise. Jupyter notebooks will be used throughout, and the entire 3 hour session will be held in CO1
- Weeks with separate exercise: 18h-19h in rooms CO 4-5-6 and 260
  - Exercise will be held in computer rooms, and you will use Jupyter notebooks to complete the exercise. Exercises for paper-based solution will also be provided a few days ahead of the exercise session

Examinations:

- There will be two midterm tests, each worth 10% of the course grade. The tests will be administered via moodle during class hours.
  - Test 1: March 27
  - Test 2: May 8
- The final examination date will be announced during the semester when available.

The course outline is as follows (outline will be updated as the course progresses, based on pace of course and other scheduling and learning factors):

| Topic | Key material |
|---|---|
| Course Introduction | <ul><li>Overview of the course</li><li>Why do we care about use of statistics?<ul><li>Observation</li><li>Model building</li><li>Inference</li></ul></li><li>Why do we care about probability?</li><li>Estimating likelihood</li></ul> |
| Introduction to statistics | <ul><li>Mean, Median, Mode, Standard Deviation</li><li>Population Statistics<ul><li>Graphical Representation</li><li>Population distributions</li><li>Mean and standard deviation</li></ul></li><li>Sampling</li></ul> |
| Probability | <ul><li>Sample spaces and events</li><li>Properties of probability</li><li>Discrete Random Variables and Probability<ul><li>Binomial and Poisson Distributions</li></ul></li><li>Continuous Random Variables and Probability<ul><li>Normal and other continuous distributions</li></ul></li><li>Joint Probability Distributions<ul><li>Covariance and Correlation</li></ul></li><li>Point Estimation</li></ul> |
| Comparison Statistics | <ul><li>Significance tests<ul><li>T tests and other hypothesis tests</li><li>ANOVA</li></ul></li><li>Regression and fitting</li></ul> |