

BIO 512 - Digital Epidemiology

Syllabus

Semester Spring 2025

Instructor Prof. Marcel Salathé

TAs Rohan Singh

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Class location TBD

Class time Tuesdays, 11-13

Thursdays, 8-10

Office hours By appointment

Communication

All electronic communication via Moodle.

Course Description

Epidemiology is a cornerstone of public health. Understanding the distribution and dynamics of diseases is critically important to manage or prevent them. Modern digital approaches are used increasingly in epidemiology. This course teaches both the basics of epidemiology as well as those approaches. It is split into a lecture series with a mid-term exam, and a graded project.

Course Material

Book: Digital Epidemiology (<https://www.digitalepibook.com>).

Slides (without notes) will be provided before class.

Course Organization

The course is split into two phases, the lecture phase and the project phase (see schedules below).

The lecture phase consists of lectures according to the schedule. Further, you will be provided with exercises, which are graded. Previous experience has shown the exercise hours are not necessary, but if you need help, we are more than happy to provide it (contact the TAs). The midterm exam counts 45% towards the final grade.

In the project phase, students are grouped into small teams. After ideation, groups will pitch their project ideas to class. Afterwards, you are tasked to build your project independently - we will help where needed. Each team will meet three times with us for a project assessment. These assessments will be graded, so that you always know where you stand. In addition, you will give two progress reports to the entire class. At the end, the full project will be shown to class, and you need to hand in a project report.

Course Schedule

PHASE 1: Lectures

18.02.25 Course Introduction
Chapter 1: Epidemiology

20.02.25 Chapter 2: Testing & Diagnostics

25.02.25 Chapter 3: Epidemiological Studies

27.02.25 Chapter 4: Infectious Disease Epidemiology

04.03.25 Chapter 5: Modeling Infectious Diseases

06.03.25 Chapter 6: Spatial Models & Network Models

11.03.25 Chapter 7: Digital Contact Tracing

13.03.25 no class

18.03.25 no class

20.03.25 Chapter 8: Digital Public Health Surveillance

25.03.25 Chapter 9: Digital Cohorts & Trials

27.03.25 Chapter 10: Ethics of Digital Epidemiology

01.04.25 **Midterm Exam**

03.04.25 Project Prototyping Workshop 1

08.04.25 Project Prototyping Workshop 2

10.04.25 Project ideation

15.04.25 Opening pitch to class

17.04.24 no class

PHASE 2: Project

29.04.25 No class - work on project

01.05.25 No class - work on project

06.05.25 **1st project assessment (graded, 5%)**

08.05.25 No class - work on project

13.05.25 1st progress report to class

15.05.25 **2nd project assessment (graded, 10%)**

20.05.25 No class - submit report, not graded

22.05.25 No class - get feedback on written report

27.05.25 **Demo (graded 10%)**
Due date final written project report (graded, 20%)

Grading

The grading is composed as follows:

Midterm exam 45%

Exercises 10%

Project assessments 15% (5 + 10)

Final demo 10%

Project report 20%

Total 100%

Attendance

Attendance at EPFL is not mandatory, but highly recommended.

Exercises

Exercises are designed to help you ensure you've grasped the material. Rather than grading on accuracy, we'll assess your effort in making a reasonable attempt - naturally, correct answers qualify as reasonable. There are 9 assignments, each contributing 1% to your grade, except the first, which offers a 2% grade. **Exercises are due Sunday midnight the week after the exercise has been handed out.**

Project

The course includes a project phase, where you are tasked to prototype a digital epidemiology application. We'll help you in choosing a project during the ideation meeting. Your initial task is a class presentation on your chosen project. Subsequently, you'll work independently with your group to develop the prototype. We'll conduct two project assessment meetings (20-30 min each) during class time, which will be graded based on guidelines provided at the project phase start. You're also expected to present your progress and provide feedback on others' projects. At demo day, you will demonstrate your work with a demo / presentation. Finally, you'll write a project report, formatted as a short paper, using a template provided at the project's start.

CODA

This is a class that thrives on your engagement - the more you put in, the more you will get out of it. Its combination of lectures, exercises, project, and project report, ensures that you get a well-rounded learning experience that goes beyond content, and includes many highly usable and transversal skills.