

Schedule

Week 1 (April 1–April 5)

Lecture 1: Introduction to the course, lab safety, lab notebooks, the goals of lab.

Mon/Tues Lab Sessions: No lab.

Wed/Thurs Lab Sessions: (0) Notebooks and lab safety orientation with TAs.

Assignments/Due Dates:

- Bring lab coats to Lab 0.
- Complete [Lab Safety Fundamentals Training](#), and upload screenshot of worksafe transcript showing completion, before Lab 1.
- Fill out feedback form by Friday at noon.

Week 2 (April 8–April 12)

Lecture 2: Reading, writing, and the goal of the scientific manuscript, cell culture.

Mon/Tues Lab Sessions: (1) Introduction to lab, measuring and microscopy.

Wed/Thurs Lab Sessions: (2) Replica molding and laser cutting demo, fluorescence microscopy.

Assignments/Due Dates: None.

Week 3 (April 15–April 19)

Lecture 3: Data analysis and statistics fundamentals.

Mon/Tues Lab Sessions: (3) Bioconjugation.

Wed/Thurs Lab Sessions: (4) Microcontact printing, fluorescent microscopy of patterned proteins, and contact angle measurements.

Assignments/Due Dates: Case study 1: Rare cell variability ([Shaffer et al](#)) due on Friday at noon.

Week 4 (April 22–April 26)

Lecture 4: Regression and standard curves, [Shaffer et al](#) review

Mon/Tues Lab Sessions: (5) Cell culture—Passaging and counting cells, introduction to sterile technique.

Wed/Thurs Lab Sessions: (6) Cell culture—Growth kinetics, cell counting (hemocytometer), observing cell density and gauging confluence.

Review Session: During Friday office hours.

Assignments/Due Dates: Reports for Labs 1–4 due on Thursday at noon.

Week 5 (April 29–May 3)

Lecture 5: Exam 1 (first hour), experimental design, guidelines for independent labs.

Mon/Tues Lab Sessions: (7) Growth kinetics, cell counting, lysis, protein content (BCA assay).

Wed/Thurs Lab Sessions: (8) Growth kinetics, MTS assay.

Assignments/Due Dates: None.

Week 6 (May 6–May 10)

Lecture 6: Cell adhesion and migration, 3D cell culture and microenvironment.

Mon/Tues Lab Sessions: (9) 3D encapsulation, preparing substrates for cell studies.

Wed/Thurs Lab Sessions: (10) Live/dead, MTS assay on encapsulated cells, sterilizing substrates.
Assignments/Due Dates:

- Reports for Labs 5-8 due on Thursday at noon
- Discuss independent project proposal with your TA during your lab session

Week 7 (May 13–May 17)

Lecture 7: Cell mechanics, mechanical microenvironment, mechanotransduction.

Mon/Tues Lab Sessions: (11) Varying stiffness substrates and cell growth, seeding cells.

Wed/Thurs Lab Sessions: (12) Quantification and analysis of cell growth and morphology

Assignments/Due Dates:

- Case study 2: Focal adhesion and migration in 3D ([Fraley, et al](#)) due on Friday at noon
- Final Independent Project Proposals due on Friday at noon

Week 8 (May 20–May 24)

No class.

Mon/Tues Lab Sessions: Lab Practical Exam

Wed/Thurs Lab Sessions: (13) Independent lab

Assignments/Due Dates:

- Reports for Labs 9-12 due on Thursday at noon.

Week 9 (May 27–May 31)

Lecture 8: Hydrogel structure and chemistry, hydrogel mechanics, 3D micropatterning, review [Fraley, et al](#).

Mon/Tues Lab Sessions: No lab (Memorial Day); Make-up labs Tuesday (if needed)

Wed/Thurs Lab Sessions: (14) Independent lab

Review Session: During Friday office hours.

Assignments/Due Dates:

- Case study 3: Substrate stiffness effect on MSCs ([Engler et al](#)) due on Thursday at noon.

Week 10 (June 3–June 7)

Lecture 9: Exam 2 (first hour), review [Engler et al](#).

Mon/Tues Lab Sessions: (15) Independent lab.

Wed/Thurs Lab Sessions: (16) Lab clean-up. *Required*.

Assignments/Due Dates: Course evaluations must be completed online by Friday at noon.

Finals

Final Lab Report due Thurs., June 13 by noon.