Schedule

Week 1 (September 30–October 4)

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

Lab

- Mon/Tues: No lab.
- Wed/Thurs: (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.

Week 2 (October 7–11)

Lecture 2: Reading, writing, and the goal of the scientific manuscript. Review Ten Simple Rules articles (1, 2, 3).

Lab

- Mon/Tues: (1) Introduction to lab, measuring and microscopy.
- Wed/Thurs: (2) Replica molding and laser cutting demo, fluorescence microscopy.

Assignments/Due Dates:

- Answer questions on Ten Simple Rules articles (1, 2, 3) before lecture.

Week 3 (October 14–18)

Lecture 3: Bioconjugation. Review Agarwal & Bertozzi.

Lab

- Mon/Tues: (3) Bioconjugation.
- Wed/Thurs: (4) Microcontact printing, fluorescent microscopy of patterned proteins, and contact angle measurements.

Assignments/Due Dates:

- Answer questions on Agarwal & Bertozzi before lecture.

Week 4 (October 21–25)

Lecture 4: Data analysis and statistics fundamentals. Review Shaffer *et al*.

Lab

- Mon/Tues: (5) Cell culture—Passaging and counting cells, introduction to sterile technique.
- Wed/Thurs: (6) Cell culture—Growth kinetics, cell counting (hemocytometer), observing cell density and gauging confluence.

Assignments/Due Dates:

- Answer questions on Shaffer *et al* before lecture.
- Report for labs 1–4 due on Thursday at noon.

Week 5 (October 28–November 1)

Lecture 5: Experimental design, guidelines for independent labs. Review Hafner *et al*.

Lab

- Mon/Tues: (7) Growth kinetics, cell counting, lysis, protein content (BCA assay).
- Wed/Thurs: (8) Growth kinetics, MTS assay.

Assignments/Due Dates:

- Answer questions on Hafner *et al* before lecture.
- Review session Friday TBD.
- Discuss independent project proposal with your TA during your lab session

Week 6 (November 4–8)

Lecture 6: Exam 1 (first hour). Cell adhesion and migration, 3D cell culture and microenvironment. Review Fraley *et al*.

Lab

- Mon/Tues: (9) 3D encapsulation, preparing substrates for cell studies.
- Wed/Thurs: (10) Live/dead, MTS assay on encapsulated cells, sterilizing substrates.

Assignments/Due Dates:

- Report for labs 5-8 due on Thursday at noon
- Final Independent Project Proposals due on Friday at noon

Week 7 (November 11–15)

Veteran's Day, no class.

Lab

- Mon/Tues: (11) Varying stiffness substrates and cell growth, seeding cells.
- Wed/Thurs: (12) Quantification and analysis of cell growth and morphology

Assignments/Due Dates:

- Answer questions on Fraley *et al* by Tuesday at noon.

Week 8 (November 18–22)

Lecture 7: Cell mechanics, mechanical microenvironment, mechanotransduction. Review Engler *et al*.

Lab

- Mon/Tues: Lab Practical Exam
- Wed/Thurs: (13) Independent lab

Assignments/Due Dates:

- Answer questions on Engler *et al* before lecture.
- Report for labs 9-12 due on Thursday at noon.

Week 9 (November 25–29)

Lecture 8: Hydrogel structure and chemistry, hydrogel mechanics, 3D micropatterning. Review Sun *et al*.

Lab

- Mon/Tues: (14) Independent lab
- Wed/Thurs: No lab (Thanksgiving); Make-up labs Wednesday if needed

Assignments/Due Dates:

- Answer questions on Sun *et al* before lecture.
- Review session Wednesday TBD.

Week 10 (December 2–6)

Lecture 9: Exam 2 (first hour), finish hydrogel mechanics.

Lab

- Mon/Tues: (15) Independent lab.
- Wed/Thurs: (16) Lab clean-up. Instron demonstration.

Assignments/Due Dates:

- Course evaluations must be completed online by Friday at noon.

Finals

Final Lab Report due Thurs., December 12 by noon.