Schedule

Week 1 (Oct 1–Oct 5)

Lecture 1: Introduction to the course, lab safety, lab notebooks, the goals of lab.
Mon/Tues Lab Sessions: (0) Notebooks and lab safety orientation with TAs.
Wed/Thurs Lab Sessions: (1) Introduction to lab, measuring and microscopy.
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 Oct 5 at noon.

Week 2 (Oct 8–Oct 12)

Lecture 2: Reading, writing, and the goal of the scientific manuscript, cell culture.
Mon/Tues Lab Sessions: (2) Replica molding and laser cutting demo, fluorescence microscopy.
Wed/Thurs Lab Sessions: (3) Bioconjugation.
Assignments/Due Dates: None.

Week 3 (Oct 15–Oct 19)

Lecture 3: Data analysis and statistics fundamentals.
Mon/Tues Lab Sessions: (4) Microcontact printing, fluorescent microscopy of patterned proteins, and contact angle measurements.
Wed/Thurs Lab Sessions: (5) Cell culture—Passaging and counting cells, introduction to sterile technique.
Assignments/Due Dates: Case study 1: Rare cell variability (Shaffer *et al*) due on Oct 19 at noon.

Week 4 (Oct 22–Oct 26)

Lecture 4: Regression and standard curves, Shaffer *et al* review
Mon/Tues Lab Sessions: (6) Cell culture—Growth kinetics, cell counting (hemocytometer), observing cell density and gauging confluence.
Wed/Thurs Lab Sessions: (7) Growth kinetics, cell counting, lysis, protein content (BCA assay).
Assignments/Due Dates: Reports for Labs 1–4 due on Oct 23 at noon.

Week 5 (Oct 29–Nov 2)

Lecture 5: Exam 1 (first hour), experimental design, guidelines for independent labs.
Mon/Tues Lab Sessions: (8) Growth kinetics, MTS assay.
Wed/Thurs Lab Sessions: (9) 3D encapsulation, preparing substrates for cell studies.
Assignments/Due Dates: None.

Week 6 (Nov 5–Nov 9)

Lecture 6: Cell adhesion and migration, 3D cell culture and microenvironment.
Mon/Tues Lab Sessions: (10) Live/dead, MTS assay on encapsulated cells, sterilizing substrates.
Wed/Thurs Lab Sessions: (11) Varying stiffness substrates and cell growth, seeding cells.
Assignments/Due Dates:

- Reports for Labs 5-8 due on Nov 6 at noon
- Discuss independent project proposal with your TA during your lab session

Week 7 (Nov 12–Nov 16)

No class.
Mon/Tues Lab Sessions: No lab Monday (Veterans Day); Make-up labs Tuesday (if needed)
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 Nov 16 at noon
- Final Independent Project Proposals due on Nov 16 at noon

Week 8 (Nov 19–Nov 23)

Lecture 7: Cell mechanics, mechanical microenvironment, mechanotransduction, review Fraley, *et al*.
Mon/Tues Lab Sessions: Lab Practical Exam
Wed/Thurs Lab Sessions: No lab (Thanksgiving); Make-up labs Wednesday (if needed)
Assignments/Due Dates: None.

Week 9 (Nov 26–Nov 30)

Lecture 8: Hydrogel structure and chemistry, hydrogel mechanics, 3D micropatterning.
Mon/Tues Lab Sessions: (13) Independent lab
Wed/Thurs Lab Sessions: (14) Independent lab
Assignments/Due Dates:

- Reports for Labs 9-12 due on Nov 27 at noon.
- Case study 3: Substrate stiffness effect on MSCs (Engler *et al*) due on Nov 30 at noon.

Week 10 (Dec 3–Dec 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 Dec 7 at noon.

Finals

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