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.