

# Schedule

## Week 1 (Oct 1–Oct 5)

**Lecture 1:** Introduction to the course, lab safety, lab notebooks, micropatterning surfaces, applications of micropatterned surfaces, photolithography, soft lithography.

**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. Fill out feedback form by Oct 5 at noon.

## Week 2 (Oct 8–Oct 12)

**Lecture 2:** Changes in surface energy (contact angle), materials that resist adsorption, bioconjugation, fluorophores and fluorescence.

**Mon/Tues Lab Sessions:** (2) Replica molding and laser cutting demo, fluorescence microscopy.

**Wed/Thurs Lab Sessions:** (3) Bioconjugation.

**Assignments/Due Dates:** Complete Lab Safety Fundamentals Training, and upload screenshot of worksafe transcript showing completion, before Lab 1.

## Week 3 (Oct 15–Oct 19)

**Lecture 3:** Cell culture, cell lines, sterile techniques, growth kinetics, 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: Cell migration in 3D culture (Fraley *et al*) due on Nov 9 at 8 AM.

## Week 4 (Oct 22–Oct 26)

**Lecture 4:** Microscopy fundamentals (brightfield, phase contrast), fluorescence and confocal microscopy, specialized microscopy techniques.

**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 by 12 PM.

## 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 by 12 PM
- 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: Substrate stiffness effect on MSCs (Engler, *et al*) due on 5/18 at 8 AM
- Final Independent Project Proposals due on Nov 16 at 8 AM

## Week 8 (Nov 19–Nov 23)

**Lecture 7:** Cell mechanics, mechanical microenvironment, mechanotransduction.

**Mon/Tues Lab Sessions:** Lab Practical Exam

**Wed/Thurs Lab Sessions:** No lab (Thanksgiving); Make-up labs Wednesday (if needed)

**Assignments/Due Dates:** Reports for Labs 9-12 due on Nov 21 by noon

## 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:** Case study 3: 3D hydrogel patterning (Gramlich *et al*) due on Nov 30 at 8 AM

## Week 10 (Dec 3–Dec 7)

**Lecture: Exam 2** (first hour)

**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 8 AM

## Finals

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