Welcome!

Land Acknowledgment

The University of Waterloo acknowledges that much of our work takes place on the traditional territory of the Neutral, Anishinaabeg, and Haudenosaunee peoples. Our main campus is situated on the Haldimand Tract, the land granted to the Six Nations that includes six miles on each side of the Grand River. Our active work toward reconciliation takes place across our campuses through research, learning, teaching, and community building, and is coordinated within the Office of Indigenous Relations.

Meet the CS 449 / 649 Team

Instructor and TAs

Dr. Matt Brehmer | mattbrehmer.ca

DC 1310 • mbrehmer@uwaterloo.ca

Assistant Professor, Computer Science

Human-Computer Interaction Lab ,
Ubietous Information Experiences Group,
Future Cities Institute

Previously:
Tableau Research (Salesforce, 2019 → 2024),
Microsoft Research (2016 → 2019)
CogSci → HCI → InfoVis

Teaching Assistants: Selena Zhang and Lucy Wang

uwaterloo CS HCI Lab PhD students

CS 449: History and Acknowledgments

early 2010s – present

See Prof. **Ed Lank**'s 2012+ CS 449 offerings as a studio-style HCI course, contextual design focus.

Later cross-listed with CS 649 (HCI Research).

Curriculum broadened in late 2010s by Lank & **Anastasia Kuzminykh**, with a more professional UX orientation.

Taught recently by **Jian Zhao** (S26), **Anamaria Crisan** (S25), **Edith Law** (F24), **Dan Vogel** (F22).

Introduce yourselves

Maybe you will form part of a project team!

Course Onboarding

Outcomes, Expectations, Website, Policies, GenAI, Communication, Schedule

Course Overview

This is a hands on studio course with team-based projects (teams of 4 or 5)

Learning Outcomes

Identify target groups of people, design studies to understand them and their needs within a sociocultural context

Create data driven designs and prototypes of different levels of fidelity

Design studies to evaluate design during different stages of development

Properly gather and analyze qualitative data from exploratory studies including data from: in-situ observations, semi-structured interviews, paper prototype evaluation, heuristic evaluations and cognitive walkthrough.

Add a high quality design of an interesting product to your portfolio

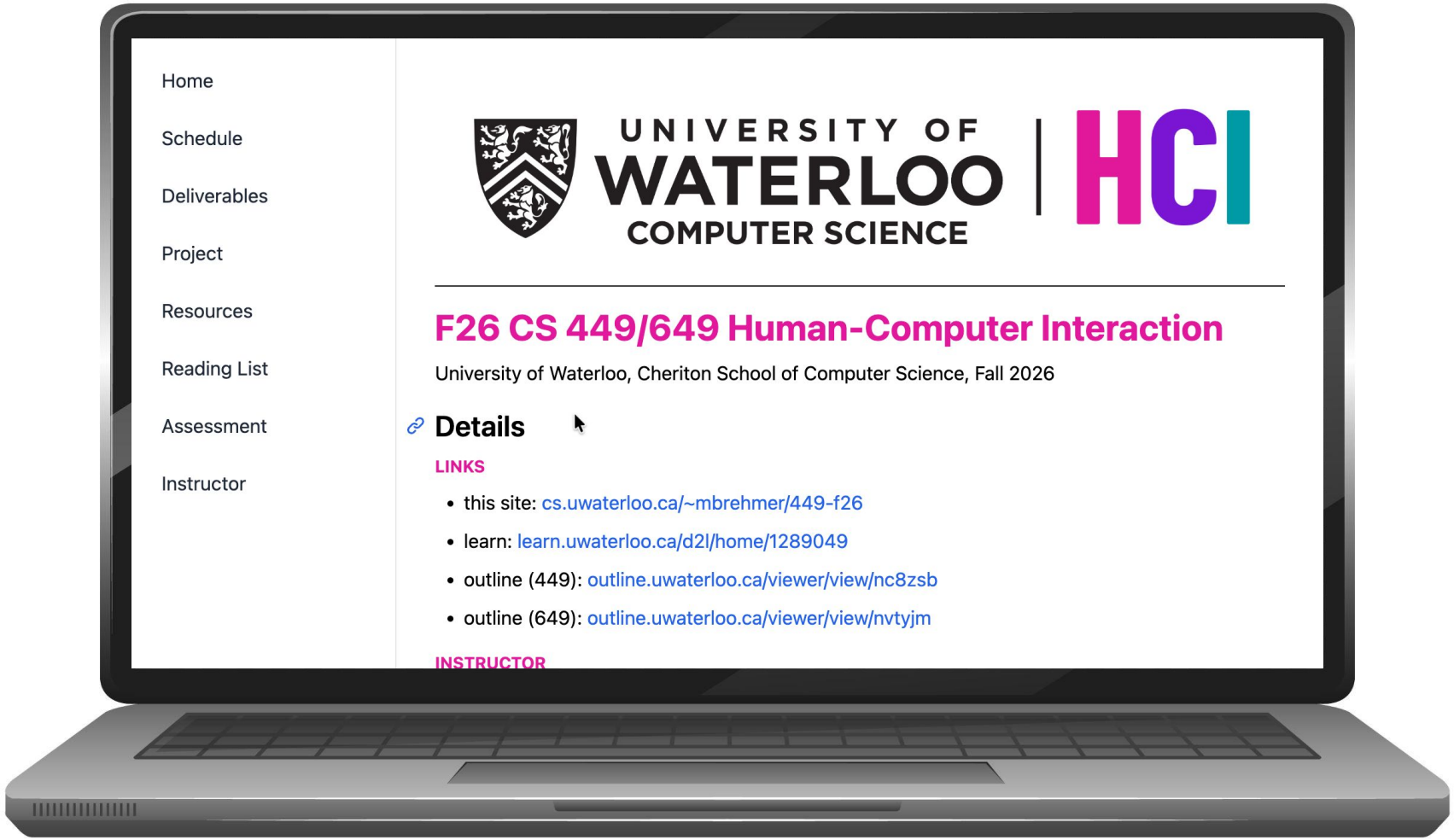
CS 649: Discover the range of HCI research methodologies

Expectations

Time management
Be proactive
Be a good team player
Aim for impact
Challenge yourself

If you attend lectures, ask questions, read carefully, incorporate feedback, and produce high quality innovative work, you will do very well.

Website → cs.uwaterloo.ca/~mbrehmer/449-f26



Policies → cs.uwaterloo.ca/~mbrehmer/449-f26

Enrolment
Lecture and studio attendance
Online communication protocol
Late penalties
Use of Generative AI
Academic integrity
Grievance
Discipline
Appeals
Accommodations
Intellectual Property

Using Generative AI

A student is allowed to use text-generating Artificial Intelligence (GenAI) such as ChatGPT to improve the writing of their assignments. However, a clear description on why and how it is used needs to be declared.

Blindly copying and pasting a large chunk of text from the GenAI is prohibited. Image generation is also subject to the same guidelines.

The course project requires that you interview real people; using GenAI to generate fake interview responses (i.e., fabricated conversations with chatbots posing as people) is **strictly prohibited**.

In addition, all the prompts used with the GenAI need to be submitted along with the assignments.

Failing to comply with this policy may result in an academic offense as outlined in Policy 71, Student Discipline.

Communication

Learn: Announcements, (some) deliverable submission.

Vevox: Lecture attendance, polling, side-channel questions / comments.

MS Teams: Announcements, general Q & A / discussion, private chat / calls (with teammates, TAs, and the instructor). All students should be automatically added to the course MS Teams workspace within the first week of the term. Team code: **4v11r1s**

Design Notebook: a Google Doc template that your team will use for documenting your design process throughout the course, with sections for TAs to provide feedback.

Instructor Consultation Hours

By appointment, book online (link on website) or message on Teams.

Mondays, Sept 14 to Dec 14 from 2:00PM - 3:00PM*

Wednesdays, Sept 16 to Dec 9 from 10:00AM - 11:00AM*

* Except weeks of Nov 2, Nov 9... details TBA

Structure

This course has two components:

- A ***lecture*** component – Mon 11:30 – 1.5 hr / week
- A ***studio*** component – Wed (101) | Fri (102) 11:30 – 1.5 hr/w

  You are required to ***complete*** studio activities

  You are required to ***prepare*** for studio activities in advance

A project based course: you conduct project work in the *studio*

Projects are team based - your attendance in studios *is* ***critical***
Expected time commitment: ~8 hours / week on average

Schedule at a Glance

F26 CS 449/649 Schedule

The schedule below is subject to change. Please check this page regularly for updates.

All To-Dos are due at **12 pm** the day before your next studio session, unless stated otherwise.

JUMP TO:

- Sept 7 – 11 (Week 1)
- Sept 14 – 18 (Week 2)
- Sept 21 – 25 (Week 3)
- Sept 28 – Oct 2 (Week 4)
- Oct 5 – 9 (Week 5)
- (Reading week)
- Oct 19 – 23 (Week 6)
- Oct 26 – 30 (Week 7)
- Nov 2 – 6 (Week 8)
- Nov 9 – 13 (Week 9)
- Nov 16 – 20 (Week 10)
- Nov 23 – 27 (Week 11)
- Nov 30 – Dec 4 (Week 12)
- Dec 7 (final presentations)

Sept 7 – 11 (Week 1) • Link

LECTURE:

- (no lecture - Labour Day holiday)

STUDIO:

- Meet instructor and TAs
- Course overview / website
- Team formation
- T1 Team contract

TO-DO:

- Submit team information
- T1 Team contract

Sept 14 – 18 (Week 2) • Link

LECTURE:

- What and why HCI
- Design process
- Value propositions
- Personas

STUDIO:

- D1 Value proposition

TO-DO:

- D1 Value proposition
- P1 Ethics Training
- P2 Persona Ideation

Schedule Example

F26 CS 449 / 649 Week 2

Lecture

- What and why HCI
- Design process
- Value propositions

Studio Prep

- Submit team information via this form.
- You will need Miro in coming weeks, and Figma during the last few weeks of the course. These are easy-to-use and powerful tools for design teams. Getting familiarized with them as soon as possible will help you a lot both in this course and your future design/development! Sign up for an account for both Miro and Figma using your UWaterloo email, and apply for their Education plans.
- Watch *How Airbnb Designs for Trust* and be prepared to answer the question: "What is the Value Proposition of AirBnB"?
- Get a head start on your team contract (**T1**).

Studio Activities

- **T1** Team contract
- **D1**: Value proposition

To Dos (After Studio)

- ✓ Complete **T1** Team contract
- ✓ Complete design notebook entry for **D1**: Value proposition
- ✓ **P3**: Prepare for next studio

Sources / References

For more information about the topics covered in lecture and reflected in the studio activity, see the following:

- 📖 Yvonne Rogers et al: Interaction Design: Beyond Human-Computer Interaction (6th Edition, 2023): Chapter 1 - *What is Interaction Design?*
- 📖 Tim Brown: Design Thinking (2008) | 📺 Designers - Think Big! (2009)
- 📺 Vox: It's not You. Bad Doors are Everywhere (2016)
- 📺 Nielsen Norman Group: The Term "UX" (2016) | UI vs. UX (2021)
- 📖 Spencer Lanoue: UI vs. UX: What's the Difference between User Interface and User Experience? (2018)
- 📖 Jaye Hannah: 10 Classic UX Design Fails That Teach Us How Not to Do UX (2023)
- 📖 Adam Bradley et al: Stop Using "Users"! An Examination of Word Usage in CHI Literature and the Impact of Objectifying People (University of Waterloo Technical Report CS-2011-26)
- 📺 Big Think: Want to Make Better Decisions? Know the Difference between Engineering and Design Thinking
- 📺 David Kelley: How to Build Your Creative Confidence (2012)
- 📺 Guy Kawasaki: The Art of Innovation (2014)
- 📺 Joe Gebbia: How Airbnb Designs for Trust (2016)

Studio + Project Onboarding

Deliverable Types, Grading, Theme, Progress Tracking, Weekly Structure

Deliverables

Five types of deliverables:

- Studio Preparation (P2 – P12)
- Studio Design & Evaluation Activities (D1 – D8, CH1 – CH2, E1 – E2, CR)
- Team Exercises (T1 – T2)
- Project Outcomes (PO1 – PO2)
- **CS 649 only:** Research Report (R1 – R2)

- Some individual deliverables (P1, R1, R2), otherwise group

- No midterm, no exam

Grading Breakdown

1. Preparation Activities - Remote (2%)		
	CS 449	**CS 649**
Ethics Training (P1)	--	--
P2-P12	2%	2%
2. Studio Activities - In-Person (60%/52%)		
	CS 449	**CS 649**
Design Activities (D1-D8)	32% (4% each)	24% (3% each)
Design Critique Sessions (CR)	4%	4%
Prototype Evaluation (E1, E2)	8% (4% each)	8% (4% each)
Challenge Report (CH1) and Presentation (CH2)	16% (12% reports, 4% presentation)	16% (12% reports, 4% presentation)
3. Team Building Exercises - Remote (2%)		
	CS 449	**CS 649**
Team Contract (T1)	1%	1%
Team Reflection (T2)	1%	1%
4. Project Outputs (36%)		
	CS 449	**CS 649**
User Interviews (PO1)	6%	6%
Final Prototype (PO2a)	10%	10%
Demo Video (PO2b)	4%	4%
Final Presentation (PO2c)	10%	10%
Design Portfolio (PO2d)	6%	6%
CS649 Only (8%)		
	CS 449	**CS 649**
Research Proposal (R1, R2)	NA	8% (2% draft, 6% final paper)

Lecture Attendance Bonus*

Lecture attendance (1%): Bonus for attending 7 or more lectures in person (not including guest lectures, panel, or final project presentations).

Guest lecture attendance (1%): Bonus for attending both guest lectures (Week 8, 9).

Panel attendance (1%): Bonus for attending the panel on HCI research in industry / academia (Week 11).

*attendance to be taken via vevox polling

Course Project: Human-Computer Interaction & the City

* UN Sustainable Development Goals

Course Project Ideas – Subtheme A (Economic)

A1 • No Poverty: high cost of living (e.g., housing, childcare), access to basic services, volunteer and charity opportunities, ...

A2 • Zero Hunger: community gardens, food banks, nutrition education, access to local food producers, aquaponics, urban farming, ...

A3 • Good Health and Well-Being: fitness programs, mental health resources, access to healthcare, finding family doctors, public spaces and parklands, reducing loneliness, biking and walking ...

Course Project Ideas – Subtheme A (Economic - cont.)

A4 • Decent Work and Economic Activity: job training programs, entrepreneurship support, supporting local artists and artisans, local job markets, ...

A5 • Industry, Innovation, and Infrastructure: inspiring the urban flâneur, urban data stewardship, land use, hyperlocal environmental sensing, ...

Course Project Ideas – Subtheme B (Social)

B1 • Quality Education: after-school programs, tutoring services, college preparation, resources for newcomers, ...

B2 • Reduce Inequalities: social equity, civic engagement, promoting / revealing intersectionality, participation in municipal decision-making, access to opportunities, confronting systemic barriers, addressing NIMBYism (Not In My Backyard) ...

B3 • Sustainable Communities: neighborhood initiatives, green spaces, local sustainability projects, public transportation, preserving local history and culture ...

Course Project Ideas – Subtheme C (Environmental)

C1 • Responsible Consumption and Production: energy and water use, waste reduction, recycling programs, supporting responsible local businesses, sustainable tourism, ...

C2 • Climate Action: preparing for and mitigating climate change impacts (e.g., flooding, wildfire), heat islands, air quality, cooling / warming centres, access to shade, tree planting ...

C3 • Clean Water and Sanitation: handwashing, public restrooms, public drinking sources, safe places to swim, ...

Project: HCI & the City – Local Actions, Global Impact

Identify a real-world problem: a specific use case and goal (e.g., a UN SDG).

Decide on a core algorithmic functionality that can be leveraged to solve the problem.

Design a novel experience that allows people to effectively interact with the algorithmic technique to complete tasks associated with the problem.

Course Project Emphasizes Talking to People

In this course, you will conduct interviews with between 6 - 8 people who are not your CS 449 /649 classmates!

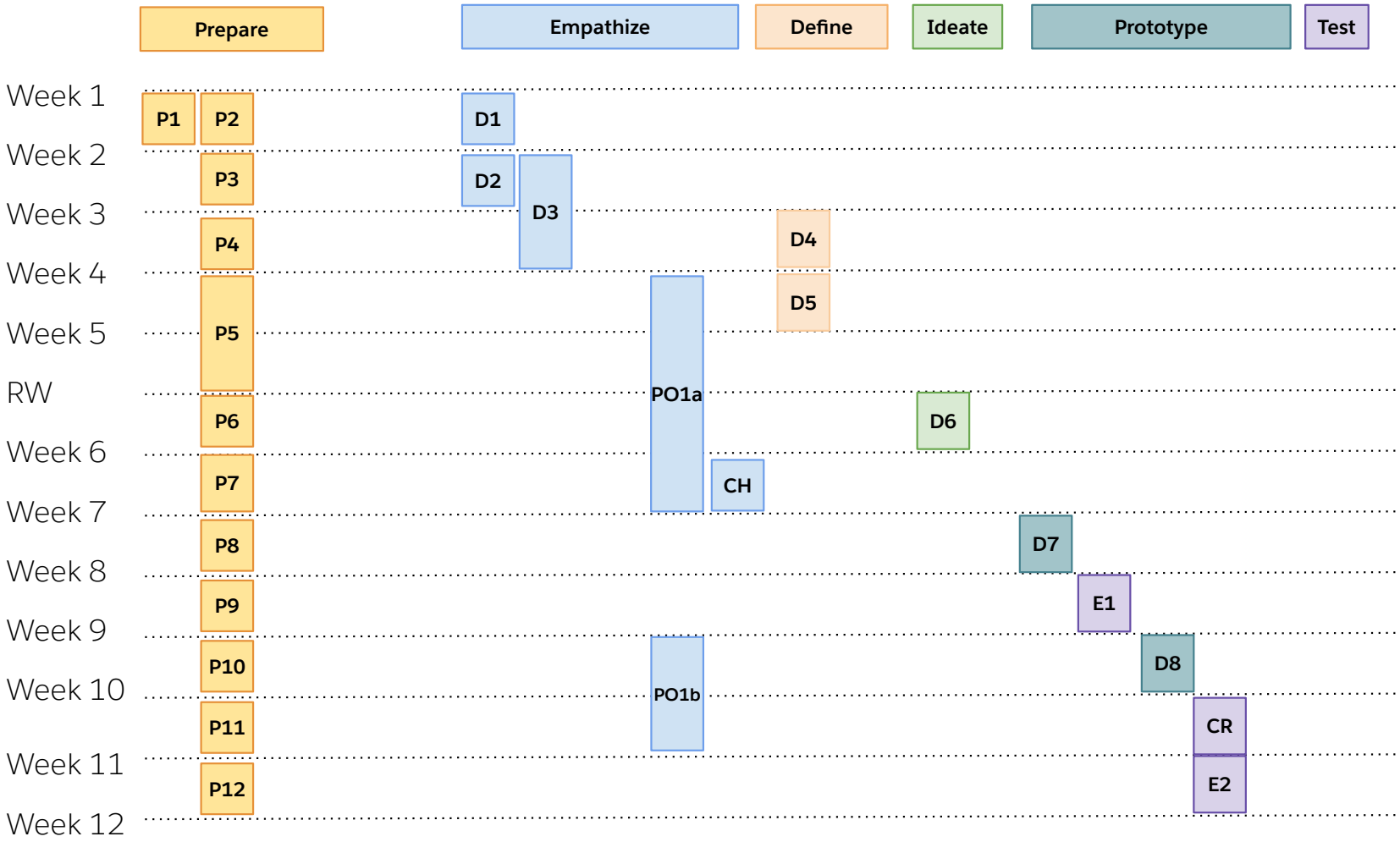
Choose you project wisely, you'll need to find people to speak to for various deliverables.

You cannot interview a chatbot posing as different people.

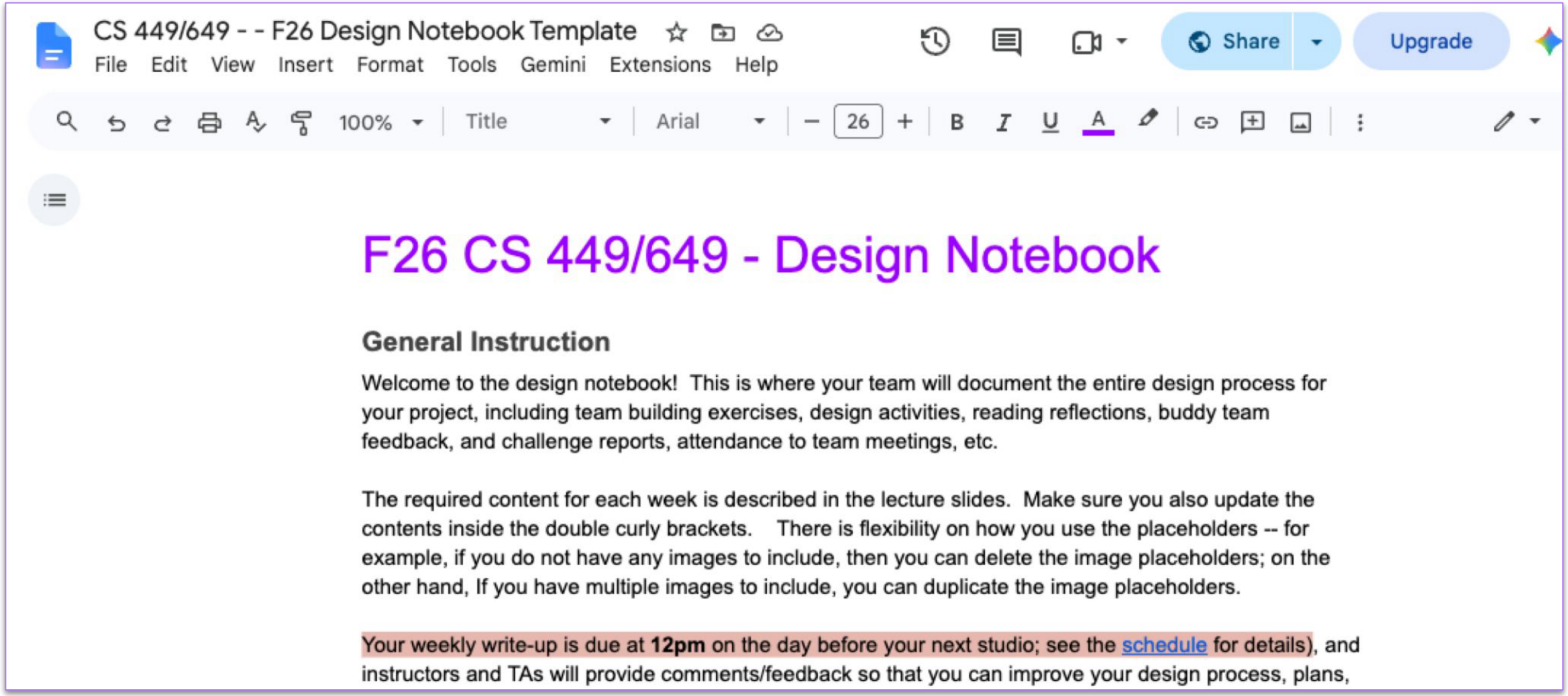
Must be adults over the age of 19.

Individuals must be able to give consent to participate.

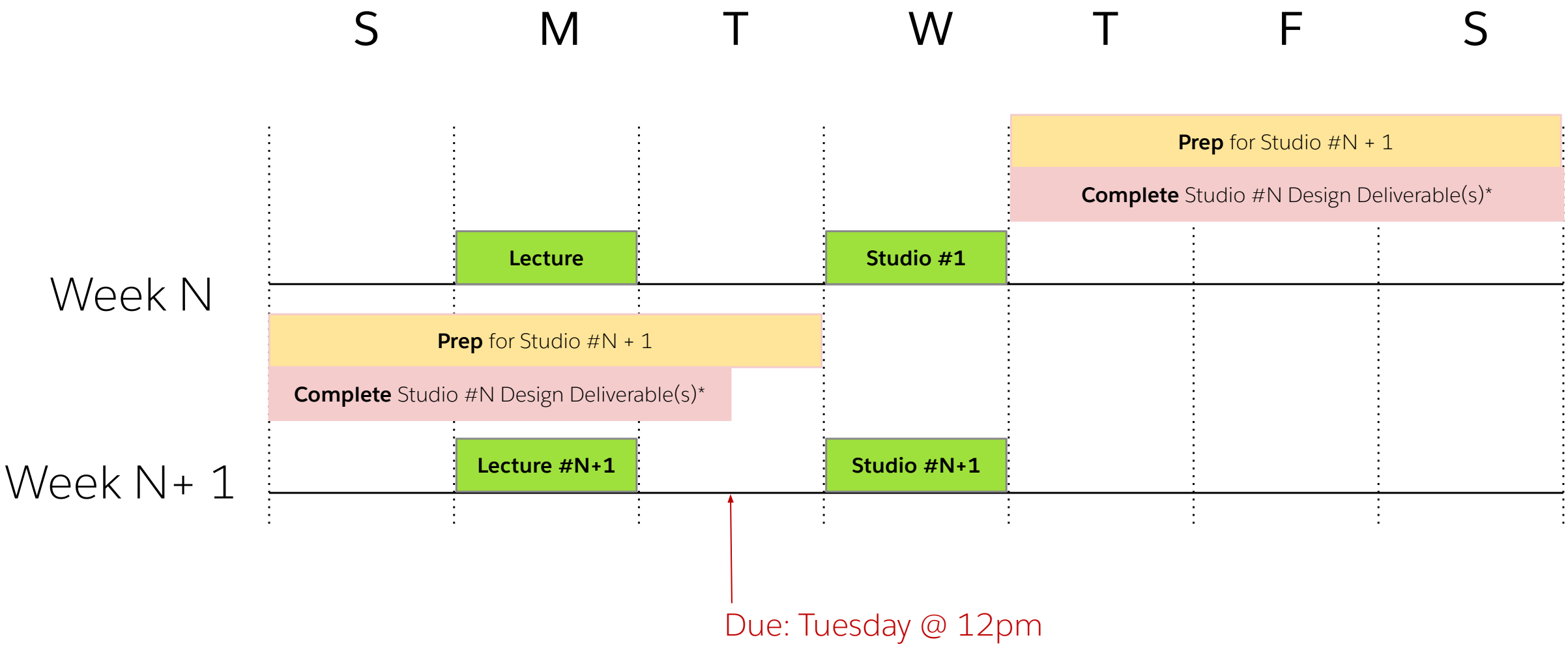
Project Deliverables Build on Each Other



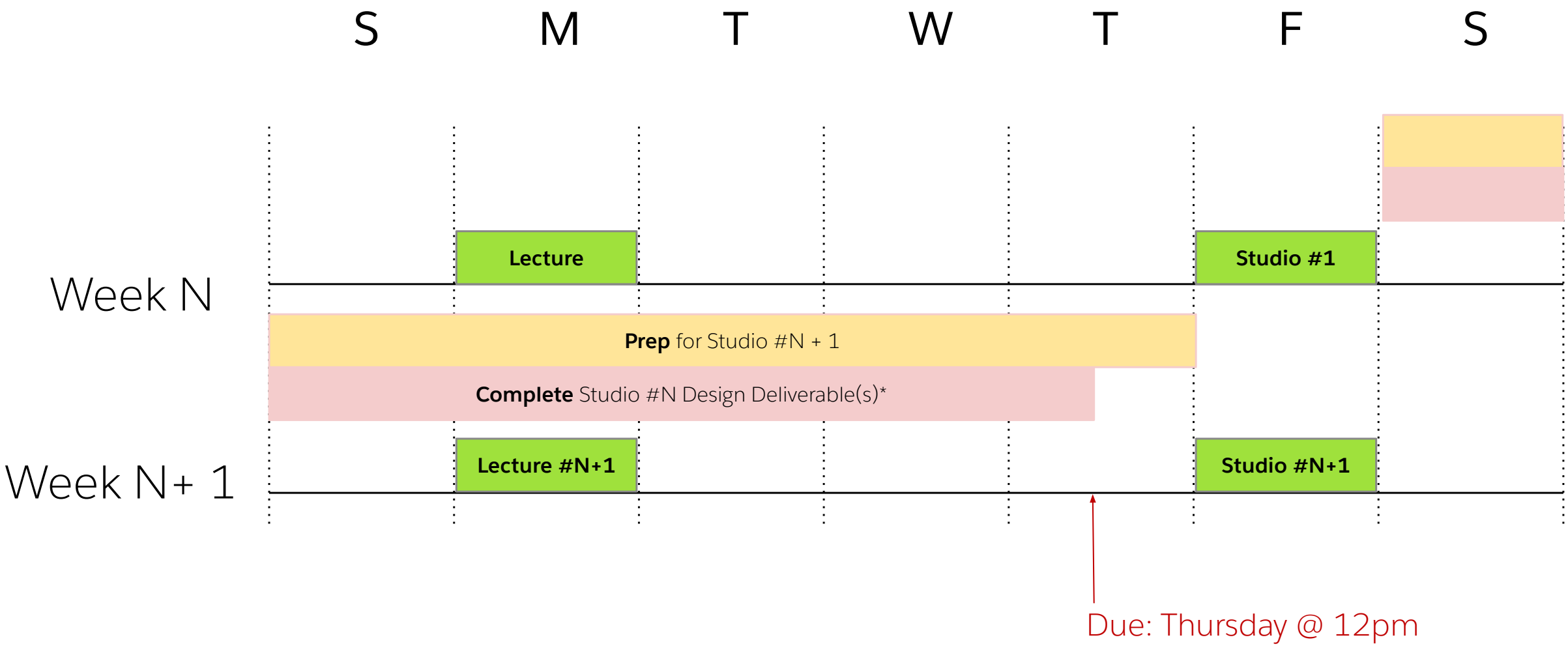
Tracking Progress and Process in the Design Notebook



Weekly Structure - Studio Section 101



Weekly Structure - Studio Section 102



Studio Attendance & Participation

Bring your laptop to studio ... at least one per team...

Doing activities with your team in-person is strongly encouraged ... on rare exceptions, part of the team can join remotely...

Team members are expected to attend and work together ... teammate evaluation comments will be collected end of the term...

The instructor and TAs visit each team working in the studio to offer help and suggestions in a collaborative style...

The instructor checks on team progress at the end of each studio session.

Typical Studio Structure*

- Meet with your team, work on **D#** activities
- Two check-ins with your team's assigned TA (duration will depend on number of teams in studio section … ~15 minutes total)
  - **First check-in** (~5 min): verify prep work, clarify studio activity
  - **Second check-in** (~10 min): show progress, clarify next steps
- Instructor visit (~5 min)
- TA / instructor team visit orders to be randomly determined each week

***Week 7**: Challenge report presentations

***Week 11**: Design critique session

Final Project Deliverables

- Interviews (6 - 8 people over the course of the term)

- Final Presentation (during last lecture on Monday December 7)

Other deliverables due one week after last lecture (Tuesday December 15):

- Final Prototype
- Demo Video
- Final Report

⚠️ HCI Grading is Subjective

We use rubrics... and we have high expectations.

High effort may not always lead to a high grade.

You will need to think, communicate, and convince.

We will look for rigor, plausibility, and innovation.

A minimal solution will not receive top marks.

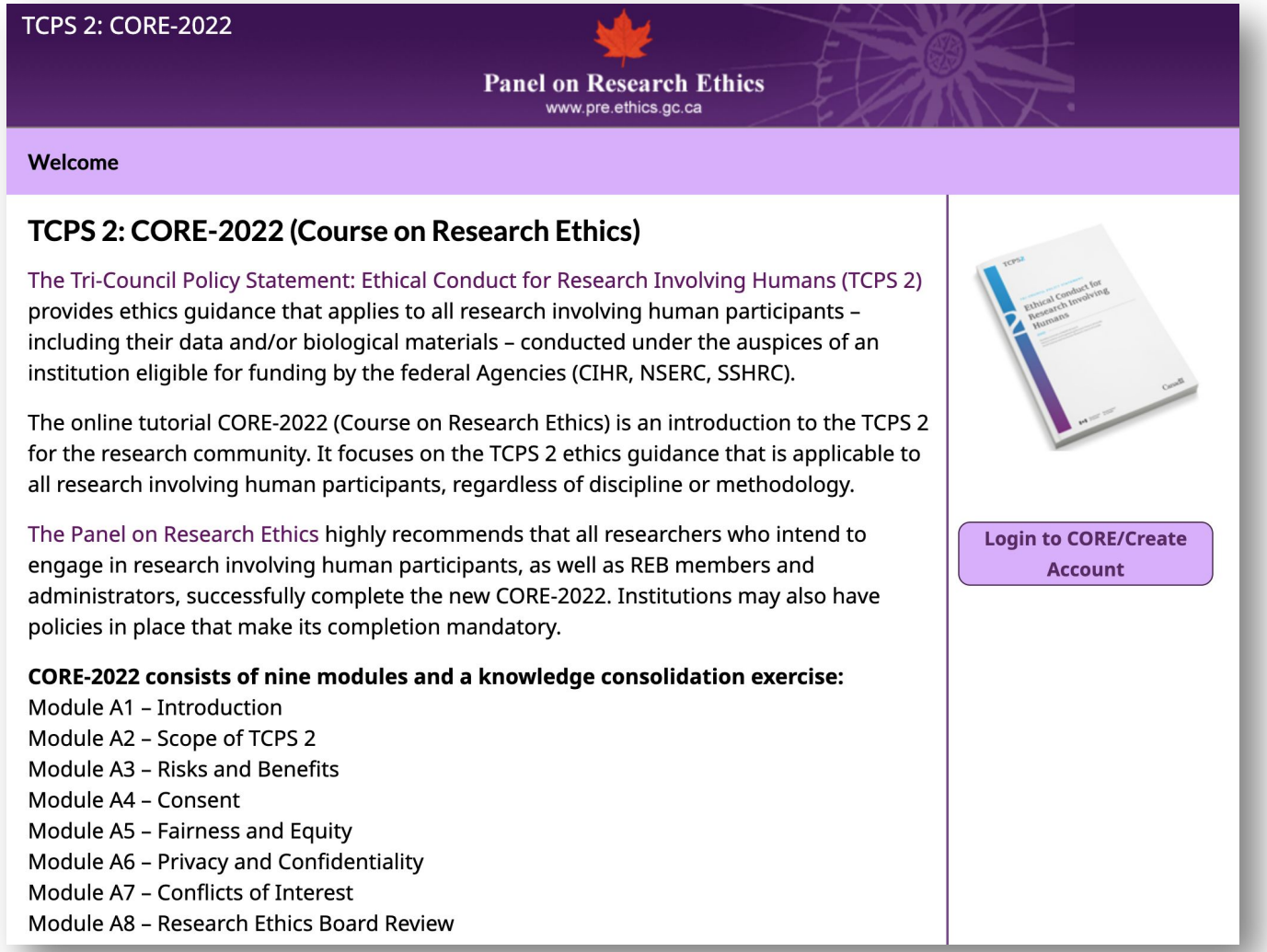
Ethics

Mandatory Training, Consent Materials

‼️ Important! You must complete ethics training!

All team members MUST complete the TCPS 2: CORE-2022 (Course on Research Ethics) BEFORE any interviews are conducted with anyone other than students taking current CS 449/649.

tcps2core.ca →

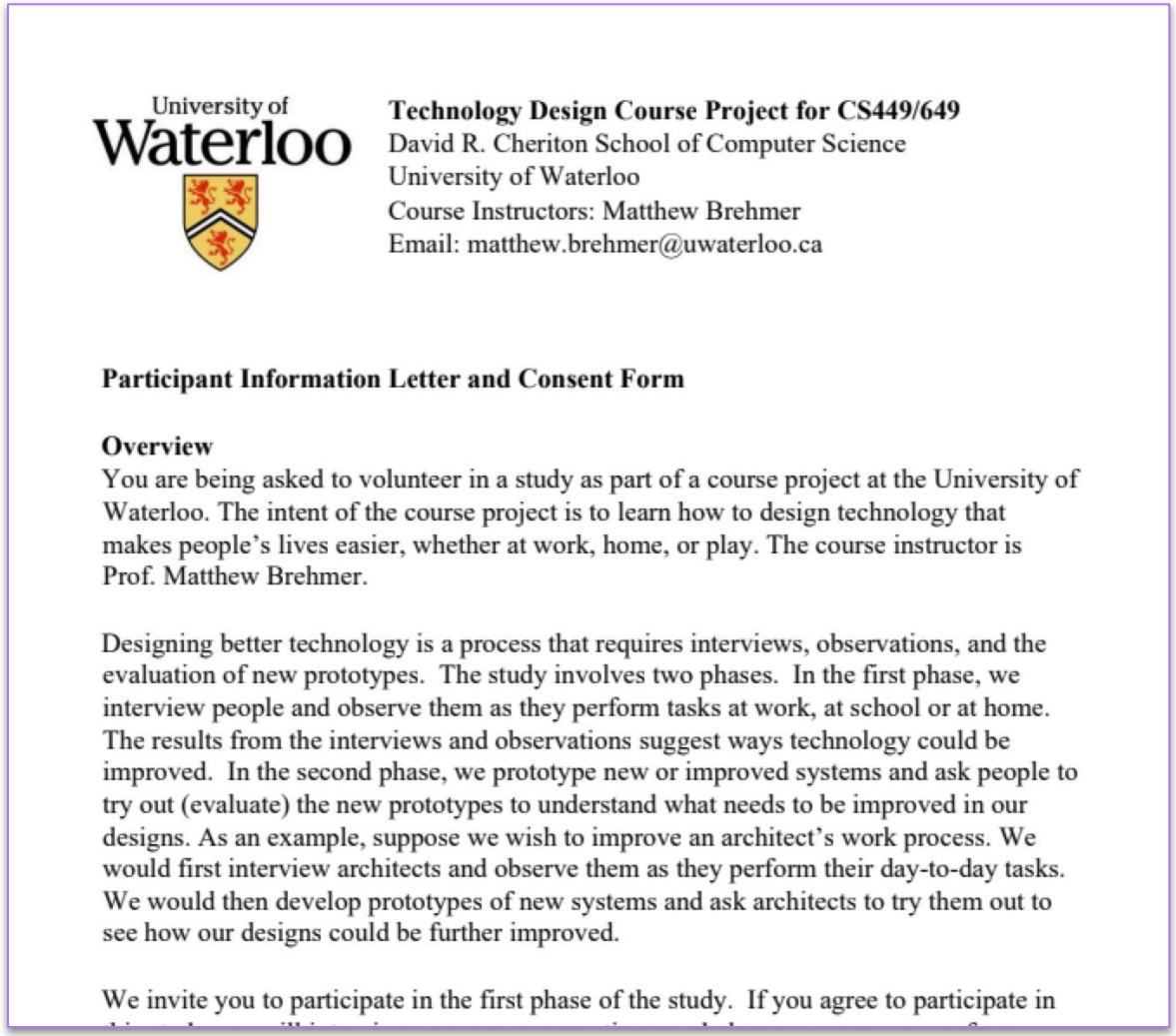


CS 449 / 649 Ethics Compliance Resources

In "Resources" page on course website:

- recruiting text
- information letter
- consent forms
- thank-you letter/text

Don't change any text!



University of Waterloo

Technology Design Course Project for CS449/649
David R. Cheriton School of Computer Science
University of Waterloo
Course Instructors: Matthew Brehmer
Email: matthew.brehmer@uwaterloo.ca

Participant Information Letter and Consent Form

Overview
You are being asked to volunteer in a study as part of a course project at the University of Waterloo. The intent of the course project is to learn how to design technology that makes people's lives easier, whether at work, home, or play. The course instructor is Prof. Matthew Brehmer.

Designing better technology is a process that requires interviews, observations, and the evaluation of new prototypes. The study involves two phases. In the first phase, we interview people and observe them as they perform tasks at work, at school or at home. The results from the interviews and observations suggest ways technology could be improved. In the second phase, we prototype new or improved systems and ask people to try out (evaluate) the new prototypes to understand what needs to be improved in our designs. As an example, suppose we wish to improve an architect's work process. We would first interview architects and observe them as they perform their day-to-day tasks. We would then develop prototypes of new systems and ask architects to try them out to see how our designs could be further improved.

We invite you to participate in the first phase of the study. If you agree to participate in

Q&A

What's on your mind?

Find a Team

Also use the “Find a Team!” channel on Teams

Team Formation Exercise

Step 1: Grouping by Existing Teams

- If you *already have a team* go against the wall - group yourself according to your team.
- If you *do not have a team* go into the middle of the room

Step 2: Project topics

- If you *have a topic already in mind* pitch it (30 seconds).

Step 3: Assignment of unassigned people

- Those in the middle of the class can go to a project group with an interesting topic or be randomly assigned to group by physically walking over to a part of the room.

Advice from Past CS 449 Students*

I think this course is worth taking to broaden your horizons about design. Gave me new perspectives when it came to building software. Make sure you find a good group though or else it will be horrible.

Show less

— *Computer Science student 2 years ago, taught by Edith Law*

Easy

Useful

Liked

Project-based course, no exam. The entire course essentially builds up to making a mock app on Figma for the theme of that term. Project starts on day 1 and in groups of 5 you do almost everything together.

Show less

— *Computer Science student 3 years ago*

Easy

Useful

Liked

am I the only one who had to work 10 hrs per week for this class for some reason?

— *Software Engineering student 2 years ago*

Easy

Useful

Liked

Possible Roles

Facilitator:	Moderates team discussion, keeps the group on task, and distributes work.
Recorder:	Takes notes summarizing team discussions and decisions, and keeps all necessary records.
Reporter	Serves as group spokesperson to the class or instructor, summarizing the group's activities and/or conclusions.
Timekeeper	Keeps the group aware of time constraints and deadlines and makes sure meetings start on time.
Devil's Advocate	Raises counter-arguments and (constructive) objections, introduces alternative explanations and solutions.
Harmonizer	Strives to create a harmonious and positive team atmosphere and reach consensus (while allowing a full expression of ideas.)

Prioritizer	Makes sure group focuses on most important issues and does not get caught up in details.
Explorer	Seeks to uncover new potential in situations and people (fellow team members but also clients) and explore new areas of inquiry.
Innovator	Encourages imagination and contributes new and alternative perspectives and ideas.
Checker	Checks to make sure all group members understand the concepts and the group's conclusions.
Runner	Gets needed materials and is the liaison between groups and between their group and the instructor.
Wildcard	Assumes the role of any missing member and fills in wherever needed.

Why Collaboration is Important

Your work will be of a higher caliber than when you're not collaborating

Collaboration is the number-one-most-desirable skill sought after by employers

Collaboration allows you to step outside of your comfort zone

But - collaboration is not alway easy

That's why you'll build a ✨**Team Contract**✨

T1: Team Contract

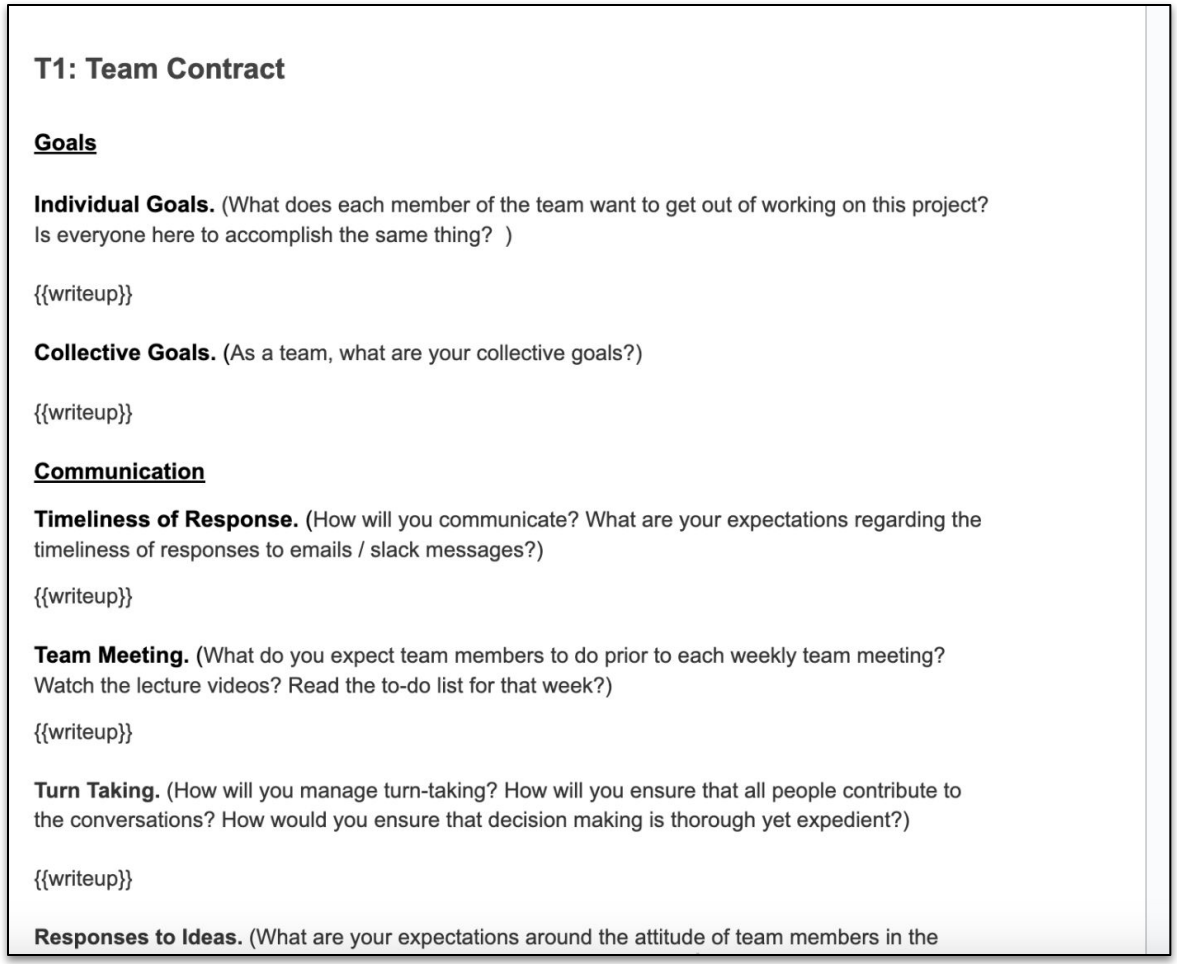
Specifies how the team will work together

What is a Team Contract?

An agreement that outlines how the group will work.

Today, for each of the team contract sections have between 4 - 5 point-form notes.

By next studio, finalize these teams contracts into prose.



T1: Team Contract

Goals

Individual Goals. (What does each member of the team want to get out of working on this project? Is everyone here to accomplish the same thing?)

{{writeup}}

Collective Goals. (As a team, what are your collective goals?)

{{writeup}}

Communication

Timeliness of Response. (How will you communicate? What are your expectations regarding the timeliness of responses to emails / slack messages?)

{{writeup}}

Team Meeting. (What do you expect team members to do prior to each weekly team meeting? Watch the lecture videos? Read the to-do list for that week?)

{{writeup}}

Turn Taking. (How will you manage turn-taking? How will you ensure that all people contribute to the conversations? How would you ensure that decision making is thorough yet expedient?)

{{writeup}}

Responses to Ideas. (What are your expectations around the attitude of team members in the

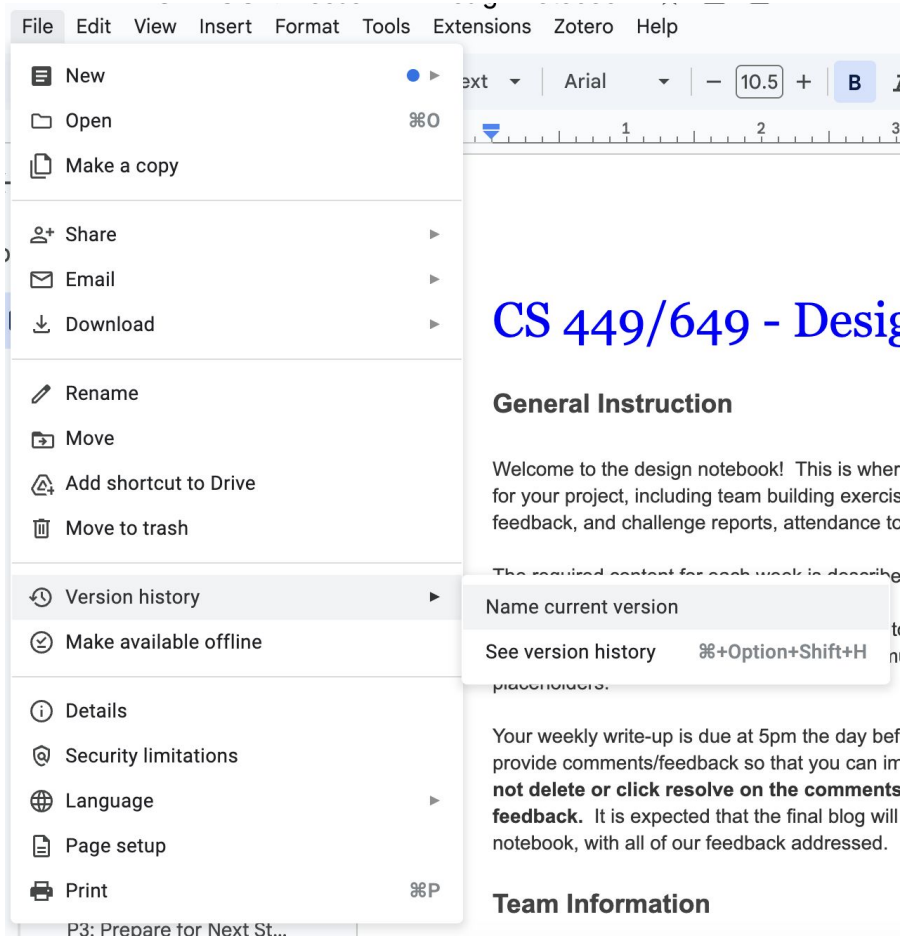
Initializing your Team's Design Notebook

Before your next studio session… TAs will create one for your team once we receive your its info

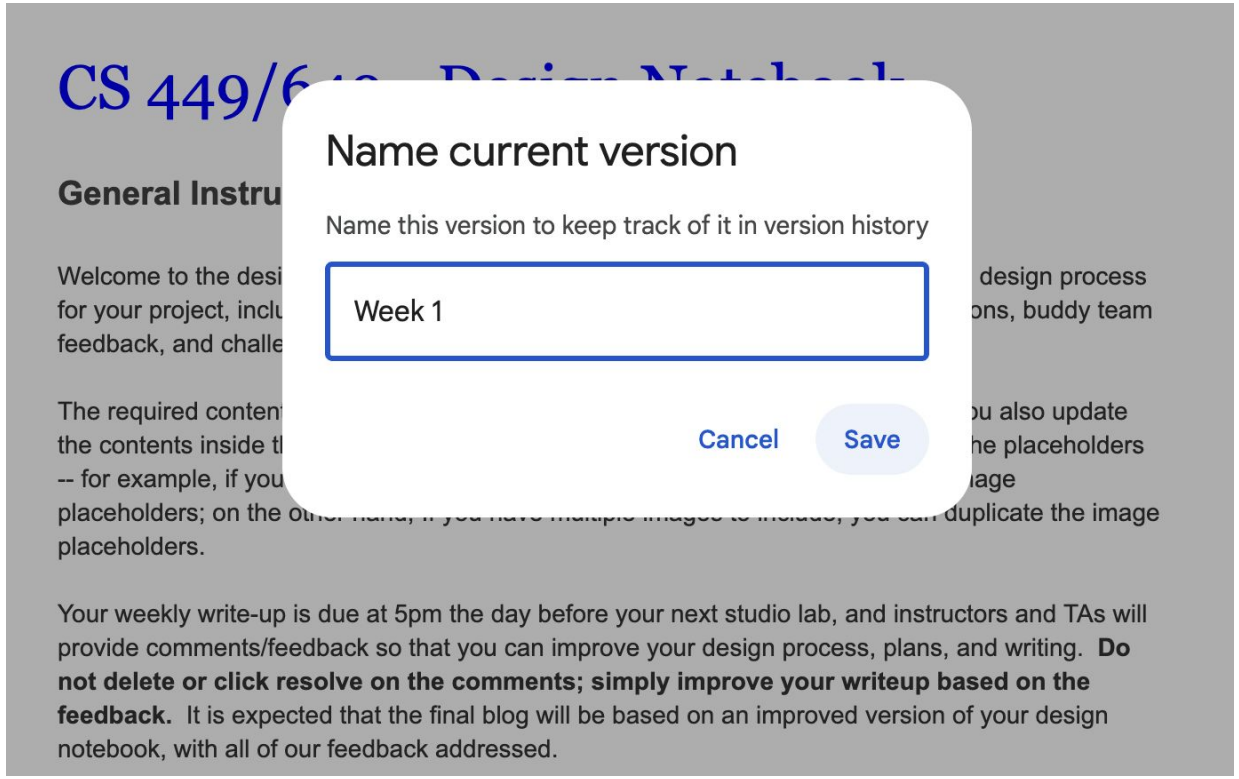
Initializing your Design Notebook

Time Stamp by creating a workbook version by 12pm the day before your next studio

Step 1: Go to file and select name your current version



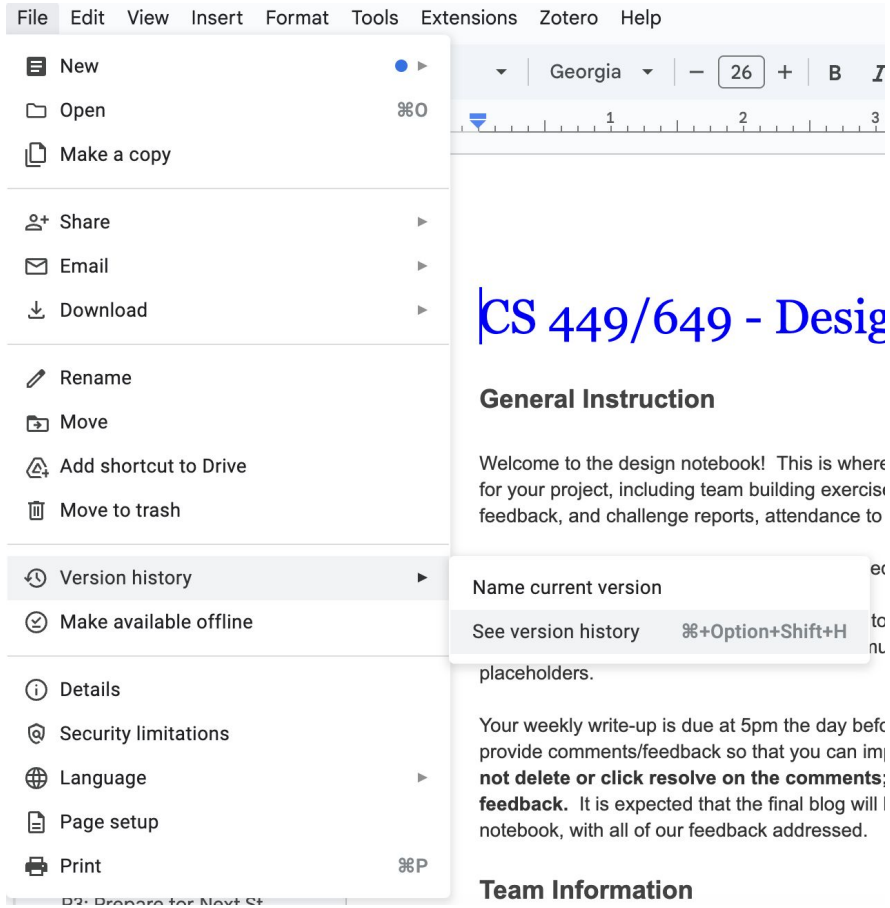
Step 2: Name it according to week (this is Week 1!)



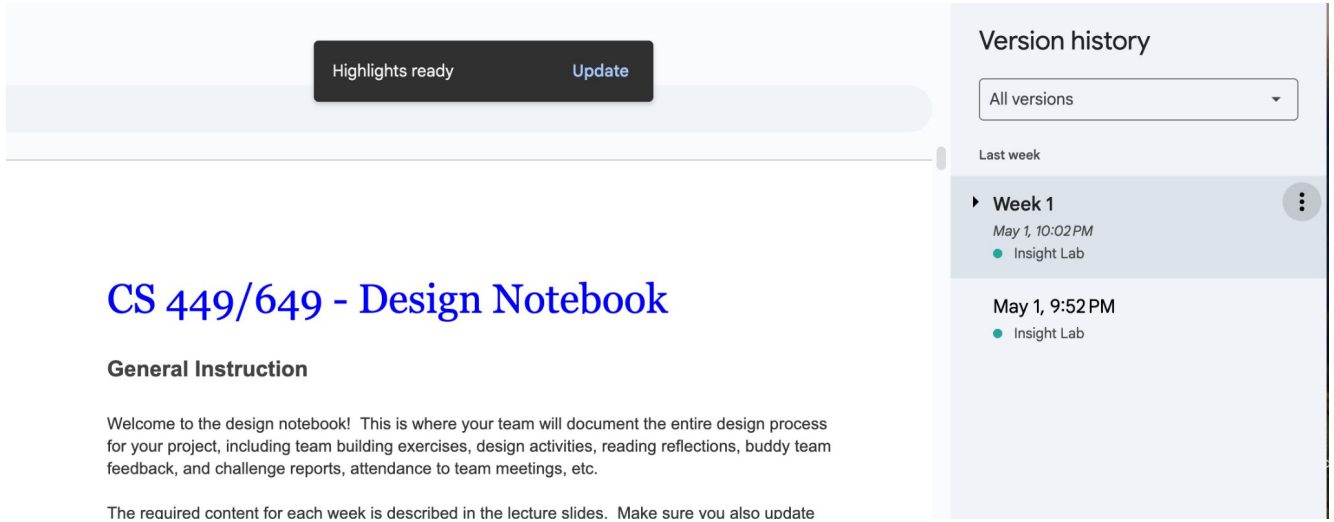
Initializing your Design Notebook

Check that it worked

Step 1: Click on file and select “See version history”



Step 2: Make sure that your version is there and correctly time-stamped



Making Progress in your Design Notebook

Document answers to the questions from the activity … Document your thinking and discussions… Add a photo of your design work

All the entries are due weekly and graded for completeness, i.e., your design notebook entry must have all required content filled in – e.g., writeup, images, captions, etc.

Don’t think of the Design Notebook as a static thing – you should iterate often… Don’t wait until the last minute to update the notebook! Your notebook should be mostly filled in by the end of each studio session.

Q&A

What's on your mind?

Looking Ahead to Week 2

What and why HCI, Design process, Value propositions