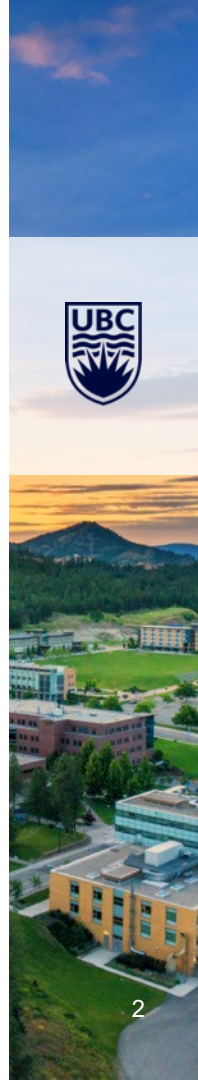
CPSC 436C Cloud Computing

Winter 2025 Term 1 (September 4, 2025)

Tony Mason (fsgeek@cs.ubc.ca), Lecturer

Welcome!

Welcome to CPSC 436C Winter 2025 Term 1 (September 2025)



Background

First time I have taught CPSC 436C

Note: this course is different than the previous versions:

- The previous instructor's materials belonged to them
- The course was tech/tool focused

This course:

- Isn't even fully formed yet (September 1, 2025 was my start date)
- Is going to be *project focused*

Course Instructor

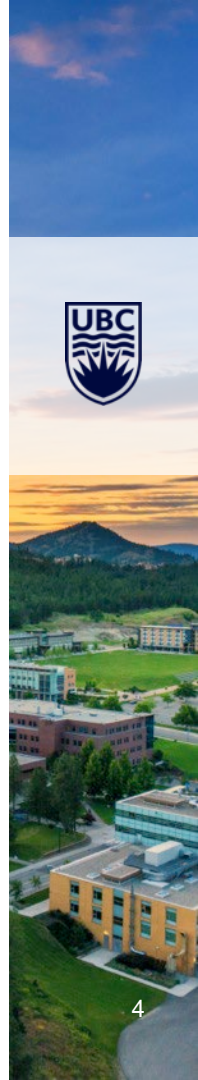
Tony Mason, Sessional Lecturer

At UBC since 2017

- Also teaching at Georgia Tech (OMSCS)
- Industry teaching (public/private tech seminars) since 1992
- PhD in Computer Science (Building human-aligned storage systems)

Distributed Systems Background:

- Stanford: Cheriton's Distributed Systems Group
- Transarc: AFS, DCE/DFS
- FORE Systems: ATM Networking
- Consulting



Teaching Assistants

Arman Moztarzadeh - arman88@student.ubc.ca

Jasper Zhao - xzhao09@student.ubc.ca

Office Hours TBA

Waitlist

If you are on the waitlist:

- Come to class
- Work on assignments
- Will extend deadlines if you join late

Current 80 students (2025/09/02 @ 10:32 AM):

- Cap is 80 students (UBC sets this, not me)

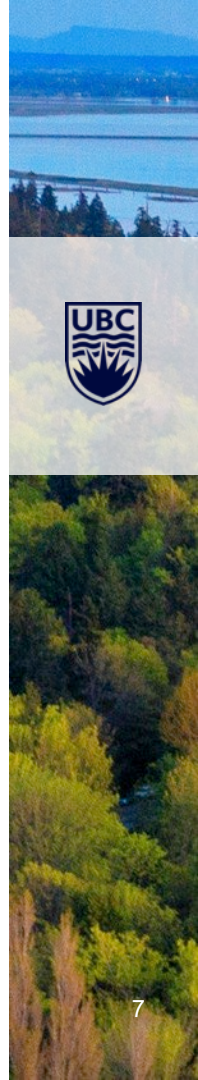
Resources

Canvas - https://canvas.ubc.ca/courses/135228

My website - https://fsgeek.ca/teaching/cpsc-436c-2025-winter-term-1/

Discord - https://discord.gg/cpsc436c

Twitch - https://www.twitch.tv/fsgeek2



Communications

Use Canvas for **all** official course-related communications

- Not on Canvas? Not official.

TA Office Hours: TBA

Instructor:

- Private Meeting: by appointment
  - In person (must book a private space)
  - Online (Discord or Zoom)
- Office Hours (Discord)
  - Monday 14:00-15:00 PT
  - Thursday 16:00-17:00 PT

Course Overview

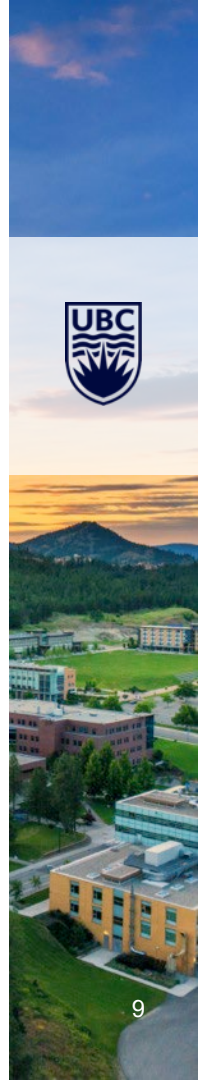
Learning Goals

Schedule

No exams, project only

Advice:

- Make sure you submit **everything.**
- Plan before you code
- Use Piazza and/or Discord
- Pick a good group



Learning Goals

Understand fundamental concepts:

- Problem decomposition
- Constraint analysis (cost, scale, security, environment)
- Architectural patterns & trade-offs
- AI collaboration & critical evaluation
- Systems thinking over tool mastery

Key Skills:

- Design
- Communications
- Meta-analysis (self-reflection)

Workload

Weekly commitment:

- 3 hours lecture/week
- 3-5 hours project work/week
- 1-2 hours Discord/peer feedback
- 8-10 hours/week typical

Increased time:

- Project weeks (12-15 hours)
- Capstone time
- Debugging – cloud service issues can be unpredictable
- AI – speeds up coding, slows you down planning and unraveling hallucinations

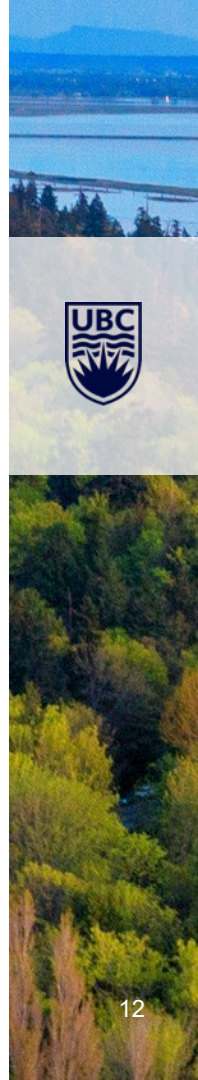
Projects

Midterm Capstone Pitch (20%)

- Solo (video) presentation of your proposed capstone project
- Problem analysis & architectural approach required
- Can be used to recruit others *if* you choose to do a team project
- Goal: assess your systems thinking & real-world constraint identification

Capstone Project (30%)

- Focus: design process (**not code**)
- 5-7 minute video presentation (problem analysis, design rationale)
- Git repo with full development provenance required
- Includes challenges not directly in the course curriculum

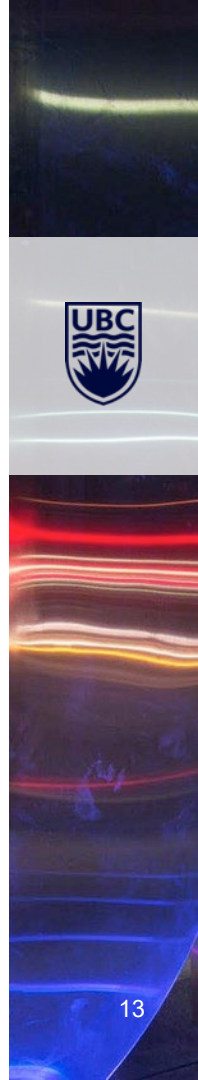


Cloud Computing Project Examples

Seeds – shared over the next six weeks

Note: these are *ideas*

- **Goal:** inspire you
- **Target:** help you find a problem/project of interest



Warm-up Questions

Generative AI

Generative AI uses deep learning models to analyze massive amounts of data and produce original outputs in response to prompts. Unlike traditional AI, which may simply categorize or process existing data, generative AI creates novel content, including human-like text, realistic images, and even music or code - https://research.ibm.com/blog/what-is-generative-AI

When Your Side Project Goes Viral...

- Yesterday: 100 requests/day
- Today: 50,000 requests/hour
- Infrastructure: One EC2 instance (parent's credit card)
- Result: $2000 bill + awkward conversattion at dinner

Welcome to Cloud Computing:
Scaling is easy,
paying is hard.

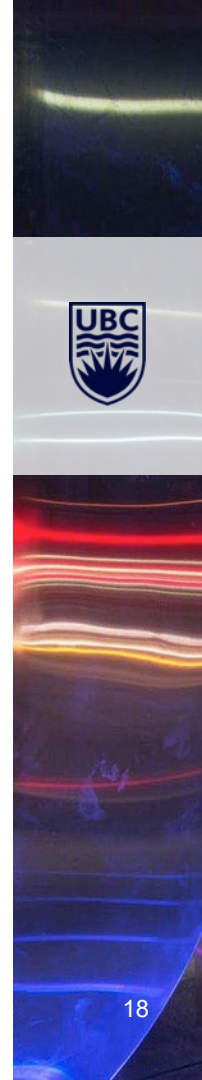
An unattended loop cost me $3,500 overnight

Gemini code kept running in an automated process while I was asleep.

$3,500
overnight

EC2 vs Lambda: The Cost of Going Viral

Item	EC2 + ALB (Always On)	API Gateway + Lambda (Pay per Use)
Compute Platform	$15-35/mo	$3-4/mo
Load Balancer/ API front	$16 + LCU charges	$1.50 (HTTP API)
Data Transfer (~150GB/mo)	$13-14	$13-14
Rough Total	$45-70+	$18-22



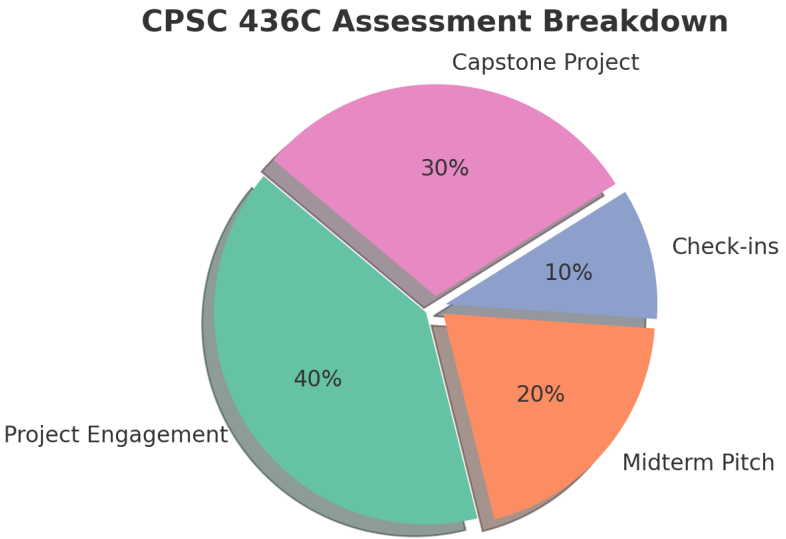
Course Structure

Project Engagement

Check-Ins

Midterm Pitch

Capstone Project



Course Structure: Project Engagement

Design Quality

- Problem framing & analysis
- Implementation (Git provenance)
- Peer collaboration (feedback/engagement with others)
- Project progression

Course Structure: Design Projects

Project 1: Scalable Prediction

- Solo project

Project 2: Overnight Batch Data

- Small group optional (up to 3)

Project 3: Real-Time Anomaly Detection

- Small group optional (up to 3)

Note: all materials will be shared with the class. Do not include personally identifiable information in your work if you wish to remain anonymous.

Peer Feedback

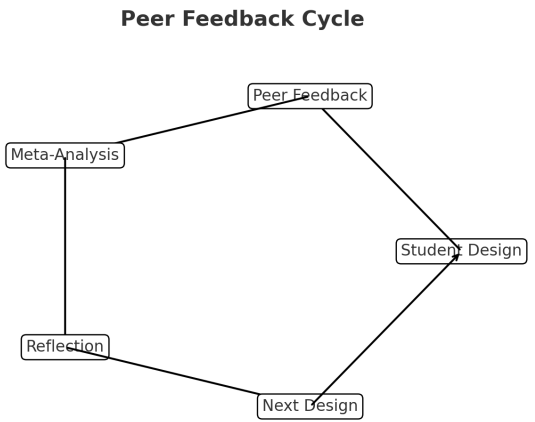
Design: create/submit project design

PF: review work of others, provide constructive feedback

Meta-Analysis: review feedback received

Reflection: revise your own design

Goal: to learn by helping others improve, not “performative” work



Check-Ins

Bi-Weekly Reflections

- One paragraph (reflection)
- One question (insight)
- Goal: identify blocking issues quickly

Grading: this is pass/fail – you either submit something (and get credit) or don't submit something and don't get credit.

Due date/times are normally at the start of class on Tuesday (helps avoid the "weekend crunch")

Midterm: Capstone

Your Project Idea in 5 minutes or less

- Solo pitch (video)
- Problem analysis + architecture sketch
- This is your project pitch to your investors
  - Classmates
  - External funding

Note: no code requirement. This is an idea pitch, not a product demo.

Final: Capstone Project

Groups allowed **up to five students**

Weekly Reports: document your progress
Project Design: Due November 21, 2025
Project Code: Due December 5, 2025
Project Report: Due December 5, 2025
Project Presentation: Due December 5, 2025
Late Option: **no penalty** for submission of report/presentation by December 19, 2025.

Capstone Project is **25%** of your total grade.

MURPHY WAS AN OPTIMIST

Discussion

Too much background… Let's talk.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