

# MIE240: Human-Centred Systems Design

Course Introduction



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## Teaching team

### Course instructors

- Prof. Alfred
- Prof. Tihayni
- Prof. Sheridan

### Teaching assistants

- Virupaksh Agrawal (Head TA)
- Mohammad-Amin Azad
- Myesha Senior
- Tosin Akintunde
- Ruben Tjhie

### TCIs

- Megan Levy
- Mandeep Malhorta
- Stacey Zoutis
- Brandon Lista



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## Course instructor

- Florida International University and Clemson University
- Teaching assistant for system design I and II course
- Human factors researcher and practitioner at an acute care hospital in SC, US
  - surgical instrument reprocessing
  - anesthesia medication safety
  - robotic-assisted surgery
  - retained foreign objects
  - maternal health and disparities
- Taught human factors engineering, health systems & QI, and public health



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## Syllabus

### Course objectives

- Demonstrate knowledge of basic human factors engineering concepts.
- Understand the impact of human capabilities and limitations in the design of systems.
- Apply human factors theory and principles to the analysis, design, and evaluation of systems through term long design project.
- Develop clear and cohesive communication through analysis of needs and constraints of contexts, construction of supported arguments, and organization and effective use of multiple media.
- Recognize the role of individual strengths in fulfilling different team roles.



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# Syllabus

## Required Textbook:

Lee, Wickens, Liu, & Boyle (2017). *Designing for People: An Introduction to Human Factors Engineering* (3rd edition): CreateSpace.

## Recommended Textbook:

Irish & Weiss (2013). *Engineering Communication: From Principles to Practice*. Don Mills, ON: Oxford. (Available at the Engineering & Computer Science Library.)

## Other readings:

Casey, S. (1993). *Set Phasers on Stun: And Other True Tales of Design, Technology, and Human Error*. Santa Barbara, CA: Aegean. (Available at the Gerstein Science Information Centre Course Reserves)

Assigned cases: *Act of God, Set Phasers on Stun, The Peppermint Twist, Business in Bhopal*

Benjamin, R. (2019). Race After Technology: Abolitionist Tools For The New Jim Code. Social forces. (Available online, Robarts Library, OISE/UT Library, and St. Michael's College Library)

Assigned chapter: *Chapter 2, Default Discrimination*

**Readings:** There are readings assigned for many lectures. Students are advised to complete the reading before the corresponding lecture. The readings **will** include examinable material.



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# Syllabus

**Quercus:** The Quercus site is used to record marks, post lecture notes and supplementary materials, distribute assignment instructions and conduct class surveys. You are expected to visit the site several times per week.

**Piazza:** Piazza will be used for class discussions. There will be Piazza forums related to the course material, project, exams, and case studies. The course TAs will monitor the Piazza forums and respond to your questions.

## Office hours:

- Prof. Alfred (MIE) - Tues. 2-3pm ET & by appointment, MB114, (lecture content)
- Prof. Tihanyi (ECP) - Tues. 3-4pm ET & by appointment, SF B670 (engineering comm.)
- Patricia Sheridan (ILead): By appointment: book at <https://uoft.me/teamsupport>
- Virupaksh Agrawal (Head TA) – Wed. 2-3pm, via Zoom, (project related questions)



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# Syllabus

## Breakdown and marks:

- Case studies 5%
- Tutorial activities 5%
- Midterm 10%
- Project postmortem 5%
- Project presentation 10%
- Project reports 45%
- Final exam 20%

**Case Studies:** The case studies, including those from *Set Phasers on Stun*, provide the basis for class discussions of how human factors engineering principles can be applied to real systems.

QOTT Assignment – one **quote** from the story, one **question**, and **two talking** points (e.g, topics from the story you would like to discuss). The **online submissions will be closed 11:59pm the night before class and no late submissions will be accepted**. The case studies will include examinable material.

**Tutorial activities:** Four in-class assignments completed and submitted during



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# Syllabus

**Project:** Throughout the semester, you will be working on a design project in teams of three or four. You will be required to submit

- Three reports (graded on a group basis),
- a presentation (graded on an individual basis)
- a postmortem report (graded on an individual basis)

**Examination:** Coverage comprises all lecture, tutorial, and reading material. Guest lectures and lecture aids (e.g., films) are also examinable. All examinations are **closed book and notes**. Non-programmable calculators are allowed.

- Midterm will include all material covered prior to reading week.
- The final exam is **comprehensive** of all lecture, tutorial, and reading material from the course.



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# Syllabus

**Tutorials:** Tutorials will cover project-related materials and will help you work on certain parts of your project. Tutorial activities will be graded and should be submitted during the tutorial. Details of the project can be found in the Project Description document on Quercus.

You must attend the tutorial to which you have been assigned. Students are expected to read assigned materials before the tutorial and be prepared to participate in tutorial activities. The tutorials **will** include examinable material not covered by other means.

Section/location	Day/Time	TA, TCI
01 GB119	Thurs 13:00 - 15:00	Amin Azad, Stacey Zoutis
02 GB120	Thurs 13:00 - 15:00	Tosin Akintunde, Megan Levy
03 GB248	Thurs 13:00 - 15:00	Myesha Senior, Brandon Lista
04 GB221	Thurs 13:00 - 15:00	Ruben Tjhie, Mandeep Malhorta



# Syllabus

## Academic Integrity

From <http://www.utoronto.ca/academicintegrity/>: "Honesty and fairness are considered fundamental values shared by students, staff and faculty at the University of Toronto. The University's policies and procedures that deal with cases of cheating and plagiarism are designed to protect the integrity of the institution. As a result, the University treats cases of cheating and plagiarism very seriously. Any student accused of committing an academic offence will find that the accusation is dealt with formally and that the penalties can be severe if it is determined that they did, in fact, cheat."

## Plagiarism Detection

Students will be required to submit their course essays to the University's plagiarism detection tool for a review of textual similarity and detection of possible plagiarism.

## Equity, Diversity and Inclusion Statement

All students and faculty at the University of Toronto have a right to learn, work and create in a welcoming, respectful, inclusive and safe environment. In this class we are all responsible for our language, action and interactions. Discriminatory comments or actions of any kind will not be permitted.



# Syllabus

## Statement on the Use of Generative AI

The ability to communicate engineering knowledge effectively across a range of contexts and audiences is a key learning objective in this course. Your submitted assignments must demonstrate this learning objective, and as such, should be your own original and independent work.

Because of this, students must be cautious when using generative AI (GenAI) tools (such as but not limited to ChatGPT) in their assignments. **GenAI tools may not be used to create text that is represented as your own independent work in assignments.** However, GenAI may serve as a tool for parts of the writing process, such as brainstorming, outlining, and research, if acknowledged appropriately.

**To acknowledge your use of GenAI, you should provide (1) a citation in the text and (2) a reference in your works cited** ... If you are using the output of the GenAI tool directly in your text, you must treat it like any other source, meaning you must place the text in quotation marks followed by an embedded citation .



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# Syllabus

## Accommodations:

If you have a learning need requiring an accommodation the University of Toronto recommends that students register as soon as possible with Accessibility Services (AS):

Website: Accessibility Services (AS)

Phone: 416-978-8060

Email: [accessibility.services@utoronto.ca](mailto:accessibility.services@utoronto.ca)

## Wellness and Mental Health Support:

As a university student, you may experience a range of health and/or mental health challenges that could result in significant barriers to achieving your personal and academic goals. Resources that you may find helpful:

- Accessibility Services & the On-Location Advisor
- Health & Wellness and the On-Location Health & Wellness Engineering Counsellor
- Inclusion & Transition Advisor
- U of T Engineering's Learning Strategist and Academic Success
- U of T Engineering's Mental Health Programs Officer
- My Student Support Program (MySSP)
- SKULE Mental Wellness



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# Course schedule

## Schedules:

- Course schedule
- Detailed project schedule

## Case studies

- Jan 30, Feb 11, Mar 5, Mar 11, Apr 1

## Midterm – week of Feb. 10th

## Project deadlines:

- Phase 1 deliverables due early Feb
- Phase 2 deliverable due early Mar
- Phase 3 deliverables due end of Mar

\*Please review in detail and inform teaching team of potential conflicts

Date T, 1-2 pm W, 1-2 pm F, 1-2 pm	Lecture Topic	Reading (Case Study)
07-Jan	Introduction and syllabus review	Syllabus
08-Jan	History of Human Centred Systems Design	Ch. 1
10-Jan	HF in the Systems Design Process	Ch. 2.1-2.4 (less 2.1.1 plus "Integrating HF into design processes")
14-Jan	Task Analysis	Review Ch. 2.3
15-Jan	Project Intro – Pedagogy of Assessment (Tharaji & Agrawal)	Project guidelines
17-Jan	Information processing model	Ch 6.1-6.4, 6.5 – 6.7
21-Jan	Design guidelines for cognition	Review 6.3.3, 6.4.3 6.5.5
22-Jan	Design guidelines for decision-making	Review 7.4.3, 7.5.2, 7.6.1, 7.8.1
24-Jan	Applying design guidelines	Choiceology podcast (Nudges) – 4/25/2022
28-Jan	Displays I	Ch 8.1 – 8.5, 8.7-8.9
29-Jan	Displays II	Ch 8.7-8.9
31-Jan	Design guidelines for displays	Review 8.2 (Act of God)



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## Next class (Wednesday, Jan. 8)\*

**Topic:** History of Human Centred Systems Design

**Read:** Ch. 1

\*Wednesday classes are in SF3202



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