

# MIE1401: Human Factors Engineering Syllabus

Fall 2024

## Instructor Information

| Instructor                             | Email                        | Lectures and Location   |
|--|------------------------------|---|
| Elizabeth Kittel, M.A.Sc., P.Eng., PMP | elizabeth.kittel@utoronto.ca | Fridays 11:00am - 2:00pm<br>(Starting on Sept 13 <sup>th</sup> , 2024)<br>SS 2108 (Sidney Smith Hall) |

## TA

|             |                              |
|-------------|------------------------------|
| Ruben Tjhie | ruben.tjhie@mail.utoronto.ca |
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## Course Description and Objectives

### Description

This course introduces the principles, methods, and tools essential for the analysis, design, and evaluation of human-centered systems. It explores the impact of human perceptual and cognitive factors on the design and use of engineered systems. Key topics include human information processing, decision making, workload, and human error. Students will learn and apply the human-centered systems design process, encompassing task analysis, user requirements generation, prototyping, and evaluation. Additionally, it addresses the design of procedures, displays and controls, and training systems; designing for error prevention; and human-computer interaction.

### Course Learning Objectives

- Learn the basic concepts of human factors engineering.
- Learn the importance of considering human capabilities and limitations in the design of systems.
- Develop skills to apply human factors principles to the analysis, design, and evaluation of systems.

## Course Materials

### Required Textbook

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

### Lectures and Readings

Lecture slides are provided on Quercus for most lectures.

There are readings from the textbook assigned for each week. The expectation is that you will read the material prior to lecture.

### Quercus

Quercus is used to maintain communication, record marks, post lecture notes and supplementary materials, and distribute project instructions. You are expected to visit the site each week and ensure that you are receiving course announcements and email.

**Quizzes:** Four short quizzes will be administered in-class via Quercus as per the schedule in the Course Schedule in **Table 3**. All quizzes are closed book, closed notes. They will be 20 minutes in duration.

Students must take the quiz in-person. **Please bring your laptop to class on quiz days.** Alternate arrangements will be made for students who are ill or other extenuating circumstances who cannot make it in-person.

**Table 1: MIE1401 Course Components and Weighting**

|                  |  | Component  | Weight        |
|------------------|--|--|---------------|
|                  |  | Quizzes (four)   | 20% (5% each) |
|                  |  | Project: Proposal  | 7%            |
| Understand Phase |  | Project: Task Analysis Presentation                      | 8%            |
|                  |  | Project: Task Analysis Report                            | 15%           |
| Create Phase     |  | Project: Design Specification Report                     | 15%           |
| Evaluate Phase   |  | Project: Evaluation Presentation (Design and Evaluation) | 15%           |
|                  |  | Final Exam   | 20%           |

**Project:** Table 2 below lists the project stages and due dates. Further details are posted on Quercus. All deliverables must be submitted to Quercus by 11:59 p.m. of the due date. A penalty of 10% per day will be applied after the due date.

**Table 2: MIE1401 Project Information**

|                  |  | Project Deliverable                             | Assessment | Due Date  |
|------------------|--|---|------------|---|
|                  |  | Proposal (1-page)                               | 7%         | Wednesday, September 25   |
| Understand Phase |  | Task Analysis Presentation                      | 8%         | In-class Friday, October 18<br>(submit presentation material by Thursday, October 17)   |
|                  |  | Task Analysis Report                            | 15%        | Wednesday, October 30   |
| Create Phase     |  | Design Specification Report                     | 15%        | Wednesday, November 13  |
| Evaluate Phase   |  | Evaluation Presentation – of evaluation outcome | 15%        | In-class Friday, November 29<br>(submit presentation material by Thursday, November 28) |

**Final Exam:** The final exam is comprehensive of all lecture and reading material from the course. The final examination is closed book, closed notes. The final exam will be administered via Quercus during the final class. Please bring your laptop to class to take the final exam.

**Table 3: Course Schedule**

| <b>Week</b> | <b>Lecture Date<br/>(Fridays)</b> | <b>Lecture Topic and Quiz</b>   | <b>Textbook Reading</b>              | <b>Project Deliverable</b>  |
|-------------|-----------------------------------|---|--------------------------------------|---|
| <b>1</b>    | September 13                      | Lecture (first half): Course Introduction, History of Human Factors<br>Lecture (second half): Design Methods          | Chapter 1                            |   |
| <b>2</b>    | September 20                      | Lecture: Design Methods<br>Tutorial: Task Analysis  | Chapter 2                            |   |
| <b>3</b>    | September 27                      | Lecture (first half): Human Information Processing (HIP)<br>Lecture (second half): Decision Making and Biases         | Chapter 6<br>Chapter 7               | <i>Project: Proposal due Wednesday, September 25</i>  |
| <b>4</b>    | October 4                         | <b>Quiz #1: HIP and Decision Making and Biases (Ch 6 &amp; 7)</b><br>Lecture: Displays<br>Tutorial: Displays analysis | Chapter 8                            |   |
| <b>5</b>    | October 11                        | <b>Quiz #2: Displays</b><br>Lecture: Controls<br>Tutorial: Controls design  | Chapter 9                            |   |
| <b>6</b>    | October 18                        | <b>Task Analysis Presentations</b>  |                                      | <i>Project: Task Analysis Presentation, submit slides or presentation material due Thursday, October 17</i> |
| <b>7</b>    | October 25                        | <b>Quiz #3: Controls (Chapter 9)</b><br>Lecture: Evaluation Methods   | Chapter 3                            |   |
| <b>8</b>    | November 1                        | <b>Reading Week (no lecture)</b>  | Optional Ch 4 & 5                    | <i>Project: Task Analysis Report due Wednesday, October 30</i>  |
| <b>9</b>    | November 8                        | Lecture: Human Computer Interaction   | Chapter 10                           |   |
| <b>10</b>   | November 15                       | <b>Quiz #4: Human Computer Interaction (Chapter 10)</b><br>Lecture: Automation  | Chapter 11                           | <i>Project: Design Specification Report due Wednesday, Nov 13</i>   |
| <b>11</b>   | November 22                       | Lecture (first half): Human Error<br>Lecture (second half): Engineering Anthropometry and Workspace Design            | Chapter 16 (less 16.2)<br>Chapter 12 |   |
| <b>12</b>   | November 29                       | <b>Design and Evaluation Presentations</b>  |                                      | <i>Project: Evaluation Presentation, submit slides or presentation material due Thursday, November 28</i>   |
| <b>13</b>   | December 6                        | <b>Final Exam (in-class)</b>  |                                      |   |

## Additional Information and Resources

### Use of Plagiarism Detection Tool

Normally, students will be required to submit their course essays for a review of textual similarity and detection of possible plagiarism. In doing so, students will allow their essays to be included as source documents in a reference database, where they will be used solely for the purpose of detecting plagiarism. For further information about this tool, please visit: <https://teaching.utoronto.ca/resources/plagiarism-detection/>.

For the purposes of MIE1401, the reference to “course essays” above can be understood to refer to project deliverables.

### Academic Integrity

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. For more information, please visit: <https://www.academicintegrity.utoronto.ca/>.

### Copyright in Instructional Settings

If students wish to audio record, video record, photograph, or otherwise reproduce lecture presentations, course notes or other similar materials provided by instructors, they must obtain the instructor's written consent beforehand. Otherwise all such reproduction is an infringement of copyright and is prohibited.

Students may not create audio recordings of classes with the exception of those students requiring an accommodation for a disability, who should speak to the instructor prior to beginning to record lectures.

Students creating unauthorized audio recording of lectures violate an instructor’s intellectual property rights and the Canadian Copyright Act. Students violating this agreement will be subject to disciplinary actions under the Code of Student Conduct.

Course videos (if provided by your instructor) may not be reproduced or posted or shared anywhere other than the official course Quercus site and should only be used by students currently registered in the course. Recordings may be saved to students’ laptop for personal use.

### Equity, Diversity, and Inclusion

The University of Toronto is committed to equity, human rights and respect for diversity. All members of the learning environment in this course should strive to create an atmosphere of mutual respect where all members of our community can express themselves, engage with each other, and respect one another’s differences. U of T does not condone discrimination or harassment against any persons or communities.

### Accessibility

The University provides academic accommodations for students with disabilities in accordance with the terms of the Ontario Human Rights Code. This occurs through a collaborative process that acknowledges a collective obligation to develop an accessible learning environment that both meets the needs of students and preserves the essential academic requirements of the University’s courses and programs