

**COURSE OUTLINE IDES 2600A • HUMAN FACTORS/ERGONOMICS IN DESIGN • Winter
(2024)**

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Location: N/A

Office Hours: By appointment.

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Office Hours: By appointment.

Course Time and Location:

Course locations are no longer displayed on the public class schedule and are subject to change. For the latest information please refer to Carleton Central under Student Services – Registration – Student Timetable.

Course Description

Foundation course in human factors/ergonomics providing an overview of physical and cognitive considerations in product design and related design fields. Anthropometrics, biomechanical considerations, cognition, social interaction, and emotional interaction are introduced in relation to supporting user experience, health and safety, performance and productivity.

Includes: Experiential Learning Activity.

Prerequisite(s): PSYC 1001 and PSYC 1002, or PSYC 1000.

Lectures and discussion three hours a week.

Learning Outcomes

By the end of this course, students will be able to:

1. Identify and apply HF/E principles and methods to better understand issues affecting people and systems to inform potential design interventions to improve quality of life.
2. Apply relevant principles and information on anthropometrics and the physiological limitations/capabilities of people to identify issues and opportunities affecting user experience, health, safety, performance, and/or productivity.
3. Apply relevant knowledge of cognitive, social, and/or emotional factors in design to improve people's experience, health, safety, performance, and/or productivity.
4. Identify possible environmental influences on people's experience and design such as spatial considerations, materiality, lighting, thermal considerations, noise and vibration, and air quality.
5. Describe possible work/activity influences on design such as pace of work, stress, fatigue, and boredom.
6. Apply HF/E principles and methods to evaluate and/or design: seating, handles, manual materials handling devices or systems, digital devices or experiences, wearables, consumer electronics, work areas, residential products or areas, services, and/or systems.
7. Produce written reports, and oral and visual presentations demonstrating HF/E research, analysis, and design recommendations/proposals.
8. Collaborate with team members and take responsibility for individual contributions.
9. Demonstrate professional behaviour.

Course Deliverables

These are the deliverables for this course. Please see 'Appendix A Course Schedule' for more detailed information.

Reading Quizzes (20%)

Reading quizzes will consist of multiple-choice questions related to the readings specific to the corresponding week.

- The best 4 out of 6 quizzes will count toward your final grade.
- Each quiz is worth 5%.

Individual Assignment (25%)

This assignment is an application of the first part of the course, building off what was learned in weeks 1-6. This assignment consists of:

- Presentation (10%) - presentations will be on February 15th, 2024 during class time.

- Report (15%) – due on February 16th, 2024.

Group Assignment (45%)

This assignment is an application of the second part of the course, building off what was learned in weeks 7-13. This assignment consists of:

- Group Work Contract (5%)
 - This is a work agreement between the group members including the work that will be submitted, how it will be divided by the group, group responsibilities, individual responsibilities, weekly meetings with the group, and method of communication between the group to provide weekly updates.
- Reflective Exercise (5%)
 - Group reflection and provide an update on the work completed thus far, any challenges they are facing as a group, and get feedback from other classmates.
- Presentation (15%)
 - Presentation of the final work to the classmates.
- Report (20%) – due on April 10th, 2024.

Professionalism and Participation (10%)

- Giving professional and constructive feedback to classmates.
- Participate in group discussions in class and on Brightspace.

Student Access to Quiz, Test and Exam Papers

Examinations are for evaluation purposes only and will not be returned to the student.

Required Materials

Materials required for the course are listed below. You may be asked by your instructor to refer to Brightspace for a more comprehensive list of required materials.

1. Stephen Pheasant & Christine M. Haslegrave (2005). *Bodyspace: Anthropometry, Ergonomics and the Design of Work*, 3rd Edition. CRC Press, Taylor & Francis Group, Boca Raton FL.
2. Jenny Preece, Helen Sharp & Yvonne Rogers (2015). *Interaction Design: Beyond Human-Computer Interaction*, 4th Edition. John Wiley & Sons Ltd., West Sussex, UK.

More detailed information will be placed on Brightspace.

Computer Requirements

Please refer to the computer requirements on the School of Industrial Design Website. You may be asked by your instructor to refer to Brightspace for other information or requirements related to computer work.

<http://www.id.carleton.ca/undergraduate/about-the-bid-program/computer-requirements>

Individual/Group Work

Courses may include individual and group work. It is important in collaborative work that students clearly demonstrate their individual contributions.

Review/Presentation Attendance

Attendance at scheduled SID Reviews/Presentations is mandatory. These are equivalent to exams when indicated in the course outline. Failure to attend the Review/Presentation without reasonable cause will result in a grade of F. Students arriving late for the Review/Presentation or not remaining for the complete session without approval from the instructor, will be addressed on a case-by-case basis at the discretion of the instructor.

If you are not able to attend a Review/Presentation, foresee arriving late, or need to leave before it is complete, please email your instructor in advance explaining the reason for the situation. It is important that you provide a reasonable rationale for your absence, late arrival, or early departure. In the event of an illness or death in the family, you will be required to sign a form verifying your claim and this form is available through the SID administration office.

Late Submission of Lecture & Studio Deliverables

Students who do not hand in deliverables on time will have their earned grade reduced by **10%** per day up to a maximum of 3 days.

Participation and Professionalism

Active participation and professional conduct (e.g. class discussion, consultations with instructors, work ethic, etc.) are important in lecture and studio courses and may be formally evaluated by a grade.

Professionalism also includes Carleton's Policy on Academic Integrity described in more detail below with links to content that you are required to review.

Academic Integrity

Carleton's Policy on Academic Integrity is available at: <https://carleton.ca/registrar/academic-integrity/> and covers the following topics:

Plagiarism (e.g. submitting work in whole or in part by someone else, failing to acknowledge sources through the use of proper citations when using another's work).

Test and Exam Rules (e.g. attempting to read another student's exam paper, speaking to another student even if the subject matter is irrelevant to the text, using material not authorized by the examiner).

Other Violations (e.g. improper access to confidential information, disruption in classroom activities, misrepresentation of facts for any academic purpose).

This policy governs the academic behavior of students. In industrial design, ideas, and concepts come from a multitude of sources and may be modified and utilized in the design and development process. The student should reference such sources appropriately and it is strongly advised that you read Carleton's Policy on Academic Integrity prior to conducting any work at the University.

USE OF ARTIFICIAL INTELLIGENCE (AI) TECHNOLOGIES

To effectively address the incorporation of AI technologies, specifically generative AI tools, into courses, we have instituted the following guidelines.

1. Academic Integrity Standards: In the absence of explicit permission from the instructor within a given course, the use of generative AI tools to create content, (e.g., text, code, images, summaries, videos, etc.), is deemed a breach of academic integrity standards.
2. Instructor's Discretion: Instructors have the authority to grant permission for the use of generative AI tools, (e.g., ChatGPT and similar tools), based on alignment with the course's educational objectives and learning outcomes. Assignment and examination guidelines will be written to explicitly reflect this granted permission.
3. Clear Instructions: Should instructors choose to permit the use of generative AI tools, an assessment guideline will provide students with clear and detailed direction, including;
 - i. Identification of specific generative AI tools that are acceptable for use.
 - ii. Clarity on the approved applications of these tools.

These measures aim to create a balanced and transparent educational environment, ensuring both academic integrity and the responsible integration of AI technologies into the learning experience.

Requests for Academic Accommodation

You may require special arrangements to meet your academic obligations during the term. For an accommodation request for any of the below topics, refer to this link - <https://students.carleton.ca/course-outline/> and open the needed section.

Topics:

- *Pregnancy Obligations*
- *Religious/Spiritual Obligation*
- *Academic Accommodations for Students with Disabilities*
- *Survivors of Sexual Violence*
- *Accommodations for Student Activities*
- *Academic Considerations for Medical and Other Extenuating Circumstances*
- *Scheduling and Examination Support*

Statement on Student Mental Health

As a university student, you may experience a range of mental health challenges that significantly impact your academic success and overall well-being. If you need help, please speak to someone. There are numerous resources available both on- and off-campus to support you, refer to this link - <https://wellness.carleton.ca/> and open the needed section.

Topics:

- *Counselling*
- *Resource Guide*
 - *Thriving on Campus*
 - *Everyday Stress*
 - *Mild Mental Health Concerns*
 - *Moderate Mental Health Concerns*
 - *Complex Mental Health Concerns*
- *Umbrella Project*

Student Responsibility

The student is responsible for knowing the content of this course outline; the schedule of classes, assignments, and/or Reviews; and the material that was covered when absent. The studio is a professional environment and students should be working during the scheduled hours.

Unless otherwise arranged, the class will meet during scheduled class hours. Please note that attendance is important since issues and questions may be raised in class, and announcements made, along with information disseminated through Brightspace. As external professionals are often involved in our work, scheduling changes for guest lectures, presentations, and Reviews may occur at short notice, requiring students to stay informed.

Changes to the Course Outline

The course outline may be subject to change in the event of extenuating circumstances.

Appendix A – Course Schedule

W	Date	Topics	Deliverables	Assigned Readings
1	Jan. 11	Introduction to human factors/ergonomics (HF/E).		Readings from <i>Bodyspace</i> (for Quiz 1) Chapter 1 Introduction to Ergonomic Design Chapter 2 Principles and Practice of Anthropometrics
2	Jan. 18	So, what is normal? Anthropometrics and diversity.	Reading Quiz 1 (5%) – due Jan.18 @ 11:59 pm.	Readings from <i>Bodyspace</i> (for Quiz 2) Chapter 2 Principles and Practice of Anthropometrics Chapter 3 Human Diversity
3	Jan. 25	Hand anthropometrics, handedness, strength, handle design, biomechanics. What is neutral posture?	Reading Quiz 2 (5%) – due Jan. 25 @ 11:59 pm.	Readings from <i>Bodyspace</i> (for Quiz 2) Chapter 6 Hands and Handles
4	Feb. 1	Clearances, reach, range of motion, postural loading, vision related to posture.		Readings from <i>Bodyspace</i> (for Quiz 3) Chapter 4 Workspace Design
5	Feb. 8	Basics of sitting, spine considerations, anthropometric principles of seat design, seat evaluation.	Reading Quiz 3 (5%) – due Feb. 8 @ 11:59 pm.	Readings from <i>Bodyspace</i> (for Quiz 3) Chapter 5 Sitting and Seating
6	Feb. 15	HF/E considerations in work and home contexts.	Individual Assignment – Presentation (10%) – due during class. Individual Assignment – Report (15%) – due Feb. 15 @ 11:59 pm.	Readings from <i>Bodyspace</i> (for Quiz 4) Chapter 7 Ergonomics in the Office Chapter 8 Ergonomics in the Home
February 19 – 23, 2024 Winter Reading Week, No Class				
7	Feb. 29	What do we mean by user experience?	Reading Quiz 4 (5%) – due Feb. 29 @ 11:59 pm.	Readings from <i>Interaction Design</i> (for Quiz 5) Chapter 1 What is Interaction Design?
8	Mar. 7	What do we mean by cognition? Basics of cognitive frameworks.	Reading Quiz 5 (5%) – due Mar. 7 @ 11:59 pm.	Readings from <i>Interaction Design</i> (for Quiz 5) Chapter 2 Understanding and Conceptualizing Interaction Chapter 3 Cognitive Aspects
9	Mar. 14	Interface types, metaphors. natural interfaces.	Group Assignment - Group Work Contract (5%) – due Mar. 14 @ 11:59 pm.	Readings from <i>Interaction Design</i> (for Quiz 6) Chapter 6 Interfaces Chapter 7 Data Gathering
10	Mar. 21	Types of social interaction, emotional aspects of interfaces.	Reading Quiz 6 (5%) – due Mar. 21 @ 11:59 pm.	Readings from <i>Interaction Design</i> (for Quiz 6) Chapter 4 Social Interaction Chapter 5 Emotional Interaction

W	Date	Topics	Deliverables	Assigned Readings
11	Mar. 28	Working session/consultation for group assignment.	Group Assignment - Reflective Exercise (5%) – due during class.	
12	Apr. 4	Last class	Group Assignment – Presentation and prototype (15%) – due during class. Group Assignment – Report (20%) – due Apr. 4 @ 11:59 pm.	