CS7633 Human-Robot Interaction, Fall 2025

Monday/Wednesday 2:00-3:15pm
Instructional Center 211
Course Website on Canvas

Instructor: Sonia Chernova
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Office Hours: Mondays 3:15-4:00pm after class or in Klaus 1308

TAs:
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Course Description

This course focuses on human-robot interaction (HRI) and social robot learning, exploring the leading research, design principles and technical challenges researchers face in developing robots capable of operating in real-world human environments. The course will cover a range of multidisciplinary topics, including physical embodiment, mixed-initiative interaction, multi-modal interfaces, human-robot teamwork, learning algorithms, statistical methods for HRI research, aspects of social cognition, as well as ethical and societal considerations. These topics will be pursued through independent reading, class discussion, case studies and a final project.

The course will meet in person, at the above-listed time and location. Much of the benefit from the course comes from participation in in-class discussions, and relatively little content will be recorded and available online.

Learning Outcomes

Outcomes of this course include understanding of the challenges that embodied computing and robotics pose for the development of real-world systems, the ability to identify the advantages and disadvantages of different design choices, and knowledge of foundational algorithmic techniques designed to address those issues.

Textbook

None. Selected texts from conference and journal articles will be posted online.

Assignments and Grading:

The course will include the following graded assessments:

- **Reading Reflections** –30% of grade
- **Topic Co-Design** – 20% of grade
- **Course Project** – 40% of grade
- **Class Participation** – 10% of grade

- *Reading reflections:* Weekly reading assignments will be posted on Canvas, which we will then follow up with class discussion. To facilitate productive analysis and discussion, you will be required to complete a reading reflection of the assigned paper following the provided template. More details on the content of the reflection are provided in a separate document. You must submit a total of 10 writeups over the course of the semester to receive full credit, out of the 14+ readings that will be assigned in total, so you can skip some writeups without penalty.

  Late submission policy: Paper reflections will not be accepted late except by prior permission since their content will be discussed in detail in class on the due date.

- *Topic Co-Design:* The course covers many high-level topics (e.g., Explanations of Robot Behavior and Failures, Human-Robot Collaboration, etc.), each of which is quite broad. As part of the co-design component, each student will select one topic to study in greater depth prior to its discussion in class. You will conduct a short literature review on this topic, help select the assigned reading, and help inform class discussion. More details will be provided in a separate document.

  Late submission policy: Will not be accepted late except by prior permission.

- *Course Project:* Projects will be conducted individually or in small groups. Project topics will be determined in September, and final project submissions will be at the end of the semester. More details about the projects will be available in a separate document.

  Late submission policy: Will not be accepted late except by prior permission.

- *Participation:* The participation grade totals 10% of the final grade and will be determined based on active participation in class discussions. For group projects, a portion of the grade is determined by a peer review process.

Prerequisites: This is a graduate course meant for students interested in HRI research. It will be assumed that students have some background in AI, Robotics, or HCI and an interest in all three. This is a foundation class for the Robotics PhD/MS, and an approved elective for the HCC and CS PhD programs.

Course Policies

The course schedule and policies mentioned in this syllabus may change at any time during the term, but all changes will be clearly documented and announced.

Student Disability Services: If you need course adaptations or accommodations because of a disability, or if you have medical information to share with the instructor, please make an appointment or stop by to speak with Prof. Chernova within the first week of classes.

Academic Honesty Policy: Review Georgia Tech's Academic Honor Code. Any work you present as your own should represent your own understanding of the material. When external sources were used as significant points of information (sample code, etc.), the source must be referenced in your submission. Following Georgia Tech's guidelines, all suspected cases of academic cheating will be forwarded for review by the Office of Student Integrity.

GenAI Policy: Understanding how and when to use generative AI is quickly emerging as an important skill for future professions. To that end, you can use generative AI tools in the context of the Course Project and Topic Co-Design assignments. Generative AI should not be used for Reading Reflections as that defeats the purpose of the assignment. If in use, you are fully responsible for the information you submit based on a generative AI query (such that it does not violate academic honesty standards, intellectual property laws, or standards of non-public research you are conducting through coursework). All use of generative AI tools must be properly documented and cited for any work submitted in this course, such as by use of the MLA citation style guidelines.

Tentative Schedule:

Date	Topics	Co-Design Eligible
Mon, August 18	Overview, Introduction to HRI	
Wed, August 20	Fundamentals of HRI Research Methodologies through Examples	
Mon, August 25	Fundamentals of HRI Research Methodologies through Examples	
Wed, August 27	Course Projects Discussion	
Mon, September 1	*Labor Day Holiday, no class*	
Wed, September 3	Fundamentals of HRI Research Methodologies through Examples	
Mon, September 8	Project Pre-Proposal Discussion Day	
Wed, September 10	Data Analysis I Project Proposals Due	
Mon, September 15	Data Analysis II	
Wed, September 17	Theory of Mind, Building and Using Mental Models of Users	*
Mon, September 22	Affect and Emotion in Social Robots	*
Wed, September 24	Proactive Robot Assistance	
Mon, September 29	Project Check-Ins	
Wed, October 1	Non-verbal Human-Robot Interaction	*
Mon, October 6	*Fall Break, no class*	
Wed, October 8	Social Robot Navigation	*
Mon, October 13	Situational Awareness and Trust	*
Wed, October 15	Project Mid-Point "Poster" Session	
Mon, October 20	Interactive Robot Learning	*
Wed, October 22	Understanding the Effect of Embodiment	*
Mon, October 27	TBD	
Wed, October 29	Project Check-Ins	
Mon, November 3	Explanations of Robot Behavior and Failures	*
Wed, November 5	Physically Assistive Robots	*
Mon, November 10	AR/VR Interfaces for Robot Control	*
Wed, November 12	Human-Robot Collaboration	*
Mon, November 17	Project Presentations	
Wed, November 19	Project Presentations	
Mon, November 24	Future trends in HRI research	
Wed, November 26	*Thanksgiving Break, no class*	
Mon, December 1	Final report workday, no class	