ID 8803 Syllabus

Special Topics: Social Robot Design and Research Method, Section: SRD, 3 Credits

Fall 2026

Instructor Information

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General Course Information

Description

This course focuses on the human-centered design, engineering, and evaluation of social robots through a variety of interaction design and behavioral research techniques. The course framework is rooted in Human-Robot Interaction (HRI), an interdisciplinary field investigating how robots interact with people in a social world. Please note that "robot" here is a broad concept referring to cyber-physical artifacts with a certain level of autonomy (e.g., capable of physical movements or reconfigurations or both) including non-humanoids, robotic furnishings, cyber-physical installations/spaces, and many more. Students will go through a variety of in-class and after-class activities to grasp the essence of the HRI design and research methods that will be introduced during the class. These methods can also pave a solid path for students who would like to pursue future careers related to UX or IxD no matter in industry or academia.

Course Learning Outcomes

On successful completion of the course, students should be able to demonstrate:

- Development and demo of partially functional skeleton prototypes and a high-fi prototype (functional enough to make a vivid and convincing project video).
- Development and delivery of a final report that is logically sound, contently convincing, structurally clear, and well written (examples and templates will be given in the class).
- Development and delivery of a design diary that detailly records the design process, research process, and decision-making process (examples and templates will be given in the class).

- Development and delivery of a project video that clearly and vividly describes the project, and interaction videos/GIFs for the purpose of online/in-person user studies (examples will be given in the class).
- Development and delivery of a design portfolio that sells your project convincingly to your future employers and reviewers (for the group with more people only).

Course Prerequisites

No Prerequisite.

However, I do expect students to have at least entry-level (or hobby-level) skills for prototyping cyber-physical artifacts (e.g., Arduino prototyping). If you do not have such a skill, you should buy an electronics starter kit and pick it up quickly from online tutorials before the new semester begins.

Required Course Materials

All learning resources will be provided through online materials and the course website.

- *Bartneck, Christoph, Tony Belpaeme, Friederike Eyssel, Takayuki Kanda, Merel Keijsers, and Selma Šabanović. "Human-robot interaction: An introduction." Cambridge University Press, 2020. Chapter 1, 2, 4, 5, 6, 8 ~ 12.*
- *Textbook Available Online: https://www.human-robot-interaction.org/*
- *Hoffman, Guy, and Wendy Ju. "Designing robots with movement in mind." Journal of Human-Robot Interaction 3, no. 1 (2014): 91-122.*
- *Rosson, Mary Beth, and John M. Carroll. (2009) "Scenario-based design." Human-computer interaction. boca raton, FL (2009): 145-162.*
- *Kerlinger, F. & Lee, H. (2000). Foundations of behavioral research, 4th ed. New York: Harcourt. Chapter 1, 2, and 3.*

Course Website and Other Classroom Management Tools

The course will utilize Canvas for the distribution of class materials such as lecture slides, reading materials, and announcements, and for turning in all the deliverables.

Learning modes: readings, cohort learning, lectures, workshops, consultation, and group projects

- Seminars & Readings: Each week we have two (or three) class readings that are crucial for students to get familiar with the session's topic. The chosen reading materials are a curated compilation of topics-specific journal articles, book chapters, conference proceedings, and web articles. Students are expected to read

the chosen reading materials. For the two seminar classes, reading-related questions will be asked during in-class discussions **and counted as bonus points.**

- Lectures & cohort learning: Our lectures and in-class discussions are based on the required readings. Our discussions are designed to clarify concepts and share inspirations. lectures are designed to introduce innovative ideas, interesting topics, and important design-research methods for Human-Robot Interaction. Find what's exciting to you and dive into it through design-research iterations. Be excited about your project first, so that others can share your excitement (≧◡≦).
- Workshops and consultations: We have several workshops and consultation sessions since doing is the most effective way of learning. Our consultation sessions are designed to give feedback for your group projects.
- Group projects: we strongly encourage interdisciplinary learning for group projects. **Each group member will have a different focus, however, working together as a group is equally important.**

Office Hours

please be aware that the maximum office hours the instructor can provide weekly are 2 hours outside regular class time. So, please do not wait until the very last week to seek consultations for your final deliverables. Office hours are appointment-based. Please book my office hours at least 24 hours ahead of the meeting time. Here is the link you can book my office hours: https://docs.google.com/spreadsheets/d/1QICJiWHJ--TNrprcMtOgW8BLB3u908YAlPHuLTXOxbY/edit?usp=sharing

Grading Policy:

Scores for individual submissions, assignments, or any other components will be given based on the general guidelines below. Any additional grading criteria in the assignment sheet need to conform to the guidelines below:

- ***A:*** ***90.00-100%*** *Excels in quality and understanding beyond requirements*
- ***B:*** ***80.00-89.99%*** *Meets all requirements and no outstanding lack in quality*
- ***C:*** ***70.00-79.99%*** *Minor lack in quality or some requirements missing*
- ***D:*** ***60.00-69.99%*** *A small part of requirements is delivered but effort is evident*
- ***F:*** ***0-59.99%*** *Low effort or major lack in quality or no submission*

Please refer to the details of each grading component in the section below.

Description of Graded Components

For students, the course grade is composed of the following key elements: (1) Skeleton Prototype, (2) High-fi Prototype, (3) Design Diary, (4) Final Report, (5) Mid-term and Final presentations (6) Project video & interaction videos, and (7) Extra Credits.

- **An interactive, high-fidelity prototype of your design (skeleton prototype included).** The prototype should be interactive in a socially expressive way, and functional enough to generate a convincing project video.
- **A final report (paper)** of your design-research process (could become a research paper if you do it well enough).
- **A design diary** documenting the design and research activities your group has gone through.
- **Project video (interaction videos included).** Project video tells the story of your project in which interaction videos are used to show how people interact with the robot.
- **Presentation PPTs with high-quality images.** Both mid-term and final presentations will be graded. "Money shots" and PPT presentation files should be submitted online.
- **Design Portfolio.** Based on the materials, both graphical and textual, you have generated for your group project, a design portfolio can be generated (for the group with more people only).

The points of each element and submission weeks are outlined in the table below.

For the group with more people:

Skeleton prototype	Final report	Design Diary	Project video	Mid-term & Final Presentation	Peer Review	* High-fi Prototype	Design Portfolio
15 pts	20 pts	10 pts	10 pts	20 pts	10 pts	10 pts	5 pts

For the group with fewer people:

Skeleton prototype	Final report	Design Diary	Project video	Mid-term & Final Presentation	Peer Review	* High-fi Prototype
15 pts	20 pts	10 pts	10 pts	20 pts	10 pts	10 pts

** For the high-fi prototype, it should be 90% done by Wk12-C2 so that project videos can be finished by Wk13-C2. However, after that, you could keep improving it until Wk 15 when the final presentation happens. It is through the final presentation (where you need to demo*

your high-fi prototype) and your final submission of money shots that your high-fi prototype is graded.

Apart from the grading criteria above, **we have 2 bonus (extra) points** for seminar discussion participation. Students are supposed to read the required readings before the class and contribute constructive and substantive questions or responses during the discussion.

The total points will be converted into a percentage and rounded off. Students will receive letter grades **without** pluses and minuses. Students' final grade does not need to fit into a normal distribution curve: if everyone is doing super great, then everyone could get an A. Below is an exemplary grading scale:

A	B	C	D	F
90-100%	80-89.99%	70-79.99%	60-69.99%	< 60%

Extra Credit and Grade Dispute Policies and Procedures

Presenting "Seminar Discussion" offers 2 points of extra credit. The grade of each assignment on Canvas will be released on Canvas. Students should **email** the instructor within 4 days of the grades being posted (including holidays) if they have any questions about the grade. After 4 days, no grade disputes will be accepted. Upon the submission of grade disputes, regrading of certain deliverables can be requested. Please be aware that regrading may ends up with higher or lower grades depending on the quality of the regraded deliverable.

Course Schedule

WEEK # **DATE**	**COURSE TOPIC**
	Introduction to HRI and Design Topic
Week 01 (Aug. 25, Aug 27)	Week1 Class1 (Wk1-C1): Introduction to HRI, Course Schedule, and Syllabus (start reading the book chapters of behavioral change after class!) Week1 Class2 (Wk1-C2): Finish HRI and course introduction, and introduce the Design Topic.
Week 02 (Sept. 1, Sept. 3)	Wk2-C1: Seminar discussion on Designing for Behavioral Change (2 Pts Extra Credit!) Wk2-C2: **Guest Lecture on A Given Topic**
	Scenario-Based Design (SBD) for Social Robots and HRI Research Design
Week 03 (Sept. 8, Sept. 10)	Wk3-C1: Consultation on Design Topic

	Wk3-C2: Scenario-Based Design for HRI: Generate Problem Scenario; Activity Scenario with Uncanny Valley and HRI Patterns; Information Scenario with Metaphor and Interaction Mode
Week 04 (Sept. 15, Sept. 17)	Wk4-C1: Scenario-Based Design for HRI: Interaction Scenario and Low-fi Prototyping Wk4-C2: Thematic Analysis Workshop – A tool for qualitative data analysis
Week 05 (Sept. 22, Sept. 24)	Wk5-C1: HRI Research Design: HRI research design basic steps and exemplars Wk5-C2: Converge to a design idea through inter-group discussions
Movement-Centric Design (MCD) and HRI Special Topics	
Week 06 (Sept. 29, Oct. 1)	Wk6-C1: Mid-term Presentation content + Consultation for Research Design Wk6-C2: Designing a Robot with Movement in Mind
Week 07 (Oct. 6, Oct. 8)	Wk7-C1 (Oct. 6th): Fall break. No Classes. Campus open. Wk7-C2: Skeleton Prototype introduction
Week 08 (Oct. 13, Oct. 15)	Wk8-C1: Mid-term Consultation with PPT content and Skeleton Prototype Wk8-C2: Mid-term Presentation
Week 09 (Oct. 20, Oct. 22)	Wk9-C1: Consultation after mid-term presentation on how to move forward Wk9-C2: HRI Spatial Interactions and HRI Key Concepts
Week 10 (Oct. 27, Oct. 29)	Wk10-C1: HRI online survey crafting workshop + Consultation Session for User study 3 & survey crafting. Wk10-C2: Skeleton Prototype Demo: Each team presents the skeleton prototype to Yixiao for grading & feedback.
Week 11 (Nov. 3, Nov. 5)	Wk11-C1: Introduce Paper Writing Template Wk11-C2: Introduce Video Making Template
Week 12 (Nov. 10, Nov. 12)	Wk12-C1: HRI Quantitative Data Analysis I Wk12-C2: HRI Quantitative Data Analysis II
Deliverables and Communication	
Week 13 (Nov. 17. Nov. 19)	Wk13-C1: Work Session on Final Presentations, Papers, and Videos Wk13-C2: Consultation on paper writing and "interaction video" making
Week 14 (Nov. 24, Nov. 26)	Wk14-C1: Instructions on Course Deliverables II: Ted-Talk Presentation Principles Wk14-C2 (Nov. 26th): Official institute holiday -- Thanksgiving break

Week 15 (Dec. 1, Dec. 3)	Wk15-C1: Consultation on Data Analysis, Final Presentation, and Course Deliverables (Paper, Video, Final Prototype, and Design Diary) **Wk15-C2: Final Presentation**
Week 16 (Dec. 8,	Wk16-C1: Consultation for final deliverables by appointment (Important! Please bring your feedback to class for feedback!) No Class, Please keep working on the final deliverables.

Course Policies

Consent for Research Participation

The user-study sessions in class and the group projects will involve peer-to-peer participant studies, i.e., the students enrolled in the course will be recruited to conduct their own or other groups' studies. The studies utilize the design methods and tools taught normally used in user-centered studies such as user observation, interview, survey, heuristic evaluation, etc. (for an overview of the methods, refer to the section on course contents and schedule). The data will be collected using videos, audios, photographs, sketches, and/or written notes. Participants' profiles and project titles will never be attributed to file names and their meta-data. When the personal data of the participants is necessary for the process and outcome of the project (e.g., paper, poster, demo video, slide presentation, or other means of publication), the participants' responses will be anonymized. In addition. from the phase of data collection to the phase of project presentation, all data will be anonymized by replacing participants' names with nominal codes (e.g., participant A or member 1) and blurring participants' faces on photographs or videos. Both involving participants and participating in a study as a participant are an important facets of the course's learning experience as they contribute to practicing the design methods and tools, understanding and addressing end-users' wants and needs, and emphasizing the end-users. However, some students might find this setup not acceptable or questionable, and thus would have the inhibition to participate in certain studies. In this case, consult the instructor or the teaching assistant and let them know the decision in advance. Non-participation will not affect the student's end grade.

Attendance and/or Participation

You are expected to attend each class from week 1 to week 15, and attendance will be taken by the TA for each class. If there is something urgent happens (e.g., family emergency, illness, job interviews, etc.), you should email both the instructor and the TA (if there is any) about the situation the day BEFORE the class. Any unexcused absence will result in a final grade deduction:

Number of Unexcused Absence:	1	2	3	4	>4
Point deduction from the final grade:	0	1	2	5	10

Academic Integrity

Georgia Tech aims to cultivate a community based on trust, academic integrity, and honor. Students are expected to act according to the highest ethical standards. Review Georgia Tech's Honor Code and the student Code of Conduct.

Any student suspected of cheating or plagiarism on a quiz, exam, or assignment will be reported to the Office of Student Integrity, who will investigate the incident and identify the appropriate penalty for violations.

Core IMPACTS

Not Applicable.

Accommodations for Students with Disabilities

If you are a student with learning needs that require special accommodation, contact the Office of Disability Services (404-894-2563) as soon as possible to make an appointment to discuss your special needs and to obtain an accommodations letter. Please also e-mail me as soon as possible in order to set up a time to discuss your learning needs.

Student-Faculty Expectations Agreement

At Georgia Tech, we believe that it is important to strive for an atmosphere of mutual respect, acknowledgement, and responsibility between faculty members and the student body. The Student-Faculty Expectations articulate some basic expectations that you can have of me and that I have of you. In the end, simple respect for knowledge, hard work, and cordial interactions will help build the environment we seek. Therefore, I encourage you to remain committed to the ideals of Georgia Tech while in this class.

Collaboration, Group Work, and Use of Generative AI

Collaboration and teamwork are a core part of this class. By its nature, this class brings together people of many different disciplines and backgrounds and provides an opportunity for them to learn from each other and work together. It is expected that members of this class will support each other, provide constructive criticism and feedback, and work to help each other complete assignments. Teams are expected to work together towards a common goal, and to resolve any differences amicably and with respect. Failure to do so may result in a penalty assessed to the semester participation grade.

Regarding the recent rise of LLM writing tools such as Chat GPT, this course allows the use of LLMs for the purpose of programming (e.g., writing an Arduino code to control the robot). However, students must clearly specify which parts of the code are generated by Chat

GPT, and which part is written by themselves. This course does not allow students to use LLMs for paper writing or document drafting.

Regarding the recent rise of AI graphic tools such as mid-journey and DALL·E, this course allows the use of these tools for complementary elements of your work such as the background picture of PPT presentation, a layer of your Photoshop file, etc. Students should not use a completely AI-generated image as a page of their deliverables, and should acknowledge the use of such tools at the footnote of the pictures.

Extensions, Late Assignments, & Re-Scheduled/Missed Exams

All assignments must be turned in on time, or alternative arrangements must be made with the instructors prior to due date. Failure to hand in assignments on time may result in a late penalty assessment to that assignment. Extensions may be assessed in consultation with the instructors. Institute-mandated exceptions will be honored, as explained in this document: catalog.gatech.edu/rules/4/

Dissemination of Course Outcomes

Upon completion of the course, some of the course outcomes, including papers, photos, and videos of the group projects will be made available on the course website (if there is one). The students who produced the work will be credited. This is to inform and inspire future students. Perhaps, some students want to embargo their project outcomes for certain reasons. In this case, consult the instructor or the teaching assistant and let them know the decision in advance. Non-participation will not affect the student's end grade.

Inclement Weather and Digital Learning Days

With developments and improvements to digital instruction over the past few years, the Institute has developed policies to leverage digital learning as much as reasonably possible. The policy sets forth requirements, procedures, and responsibilities related to the scheduling of digital instruction and/or make-up classes due to the modification of campus operations, closing of campus, or the necessary closing of instructional spaces for any reason (including but not limited to emergencies, such as inclement weather, power outages, or other infrastructure failures). Students should await communications from their instructors regarding delivery of their classes during that period based upon the Digital Learning Days for Modified Campus Operations Policy. Students should follow guidance and/or directions provided by the Office of the Vice President for Student Engagement and Well-Being regarding student activities, events, programs and services.

Student Use of Mobile Devices in the Classroom

Mobile devices are permitted in the classroom during open work sessions and lab hours to facilitate course work. However, mobile devices should not be used during lectures, class discussions, guest presentations, critiques or any other situation where a speaker has the focus of the class. Repeated usage of mobile devices during these periods in the class will result in a penalty assessed to the semester participation grade.

Campus Resources for Students

Undergraduate Student Academic Success Resources:

Academic Support: Academic Success and Advising (a unit in the Office of Undergraduate Education & Student Success) provides free support for your courses. Students can attend scheduled supplemental review (PLUS) sessions, stop by Drop-In Tutoring, or schedule a one-on-one appointment through Knack. To explore what options work best for you, please visit us online at success.gatech.edu/tutoring, email us at tutoring@gatech.edu, or come see us at Clough Undergraduate Learning Commons, Suite 283.

Graduate Student Academic and Professional Success Resources:

A list of resources for graduate students is given on the Office of Graduate and Postdoctoral Education website. Specific information for current graduate students includes

- Academic Resources such as the Communications Center, Language Institute, Library, Catalog, Registrar, resources for conducting research, Advocacy and Conflict Resolution resources, and how to manage unexpected situations that may impact your academic performance;
- Student Resources such as Campus Services, Child Care/Family programs, Health & Wellness, Career Services, and the Student Resource Guide; and
- *Professional Development such as the programming from the Career Center and other professional development resources and events"*

Student Well-Being:

At Georgia Tech, we are concerned about your overall physical, social, and mental well-being. A comprehensive list of wellness related resources has been compiled and maintained by the Office of the Vice President for Student Engagement and Well-being (student-resource-guide (gatech.edu). More resources on supporting student well-being on the syllabus and beyond are available through the Learning Well Initiative.