



Term: Spring 2023 **Subject:** Software Engineering (SER) **Number:** 594

Course Title: Human Computer Interaction (SER 594)

Course Session

Days: T, Th

Time: 3:00 PM – 4:15 PM

Location: Poly – AGBC150

Instructor

Name: [Dr. Bharatesh Chakravarthi, Ph.D.](#)

Faculty Member, ASU APG, SCAI

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Office Hours: You can meet instructor by scheduling an appointment by email. Include [HCI] at the start of subject's line.

Course Description

Human Computer Interaction (HCI) is a **3-credit** course. Students will learn the fundamental concepts, the design principles, and the theories and methodologies to conduct user-centered research to develop interactive systems. This course aims to explore the key characteristics of human-computer characteristics, analyze and evaluate user-centered systems, and the cutting-edge research and development in HCI.

Topics include user-centered design, human cognitive and physical abilities, prototyping and evaluation techniques, and graphical design fundamentals., The course also reviews emerging areas of HCI research including mobile interaction, augmented-reality, multi-touch interaction, tangible interaction, and ubiquitous computing.

Course Objectives

1	The principles and characteristics of human-computer interaction, such as direct manipulation, usability affordances, and interaction design heuristics.
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2	The workflow for designing and evaluating user-centered designs, from need finding to prototyping to evaluation.
3	The current state of research and development in human-computer interaction, such as augmented reality, wearable devices, and robotics.

Learning Outcomes

1	Understand fundamental design and evaluation methodologies of human computer interaction.
2	Demonstrate knowledge of human computer interaction design concepts to iteratively prototype, evaluate, and improve user-centered designs with user feedback.
3	Apply theories and concepts to develop real-world application development in HCI.

Course Evaluation Components

Class Participation: Involves attending the class and participating in the discussions

Reading: The instructor will provide insights on the latest advancements in the field of HCI research and suggest book chapters/research articles during beginning of course. The students are expected to use these resources as self-study components.

Quiz: 3 Quiz's will be conducted to test and evaluate student's understanding about the key concepts discussed in the class hours.

Hands-on Group Project: Students are expected to work in teams to design and develop an intuitive prototype/model with a novel user interface. Students are free to choose the topic for their project subjected to course theme. (will be mentioned later during initial classes). Students are expected to present the project in two phases. Each team can consist of a maximum of 3 people. Students effort will be determined both by the quality of their team's collaborative work and by the quality of individual contribution to the team.

Final Demo: The final demo of the prototype/model (depicting a real-world application) developed to reflect the user-centered design and evaluation methodologies of HCI.

Final Report: It is expected to submit an 8-10 pages final report that includes a related study specific to theme selected, system design, system evaluation and the application study. A detailed report format will be shared later.

Course Plan

Students are advised to check the course web page for any changes/updates related to presentation schedule (if any), submission deadlines and for invited talks organized. The below topics are considered as reference and subjected to change.

Course Plan SER 594 – Human Computer Interaction 2023 SPRING			
Contact Session (CS)	Date	Topics Covered	Important Event
CS01	1/10/23	Introduction to Human-Computer Interaction (HCI) – Current State of the art; Futuristic opportunities in HCI	
CS02	1/12/23	AI as a tool to empower HCI – Better UIs for AI; AI for better UIs; AI-enabled wearable platforms	
CS03	1/17/23	Natural language based HCI – Styling the web; Human-Machine cooperation design space for shared control	
CS04	1/19/23	HCI Design Strategies – Sensitive experience design; Immersive experience design	
CS05	1/24/23	Immersion and Interaction in Visualization – Interactive 3D AvatAR; Mixed reality user studies	
CS06	1/26/23	Human-centered Computing – Text input; Gestural input; Eye tracking in HCI;	Team formation confirmation
CS07	1/31/23	Interaction Schemes and Patterns – Digital interaction design; Input modality; Users’ sense of agency	
CS08	02/02/23	Systems and Tools for Interaction Design – Haptic sensing; Gesture control	
CS09	02/07/23	Sensing Techniques I – Wearable sensing & computing;	
CS10	02/09/23	Sensing Techniques II – Wearable sensing & computing;	Topic confirmation
CS11	02/14/23	QUIZ 1	QUIZ 1
CS12	02/16/23	Novel Visualization Techniques – Quantitative data visualization; Immersive analytics;	

CS13	02/21/23	Interaction Design Space Dimensions – Speech, touch and visual interactions	
CS14	02/23/23	Human Behavior Synthesis – Scene semantics; Spatio-temporal user interaction	
CS15	02/28/23	Expressive interactions – Hand and finger interfaces; Virtual object Interactions	
CS16	03/02/23	MIDWAY SUBMISSION/REVIEW	MIDWAY SUBMISSION
CS17	03/07/23	SPRING BREAK	
CS18	03/09/23		
CS19	03/14/23	XR and Perception – Situation awareness-based interactions; visual perception; Human-body perception	
CS20	03/16/23	Gaze-based Interaction – Eye gaze inputs; Hands-free interfaces; 3D object manipulation;	
CS21	03/21/23	QUIZ 2	QUIZ 2
CS22	03/23/23	Gaming Interactions – Interactive gaming design strategies; Voice controlled gaming;	
CS23	03/28/23	Interactions in Virtual Reality (VR) I – Movement-based interactions through human body and VR systems	
CS24	03/30/23	Interactions in Virtual Reality (VR) II – Depth adaptive cursor for 3 DoF interactions	
CS25	04/04/23	Proxemics for Human-Agent Interaction in Augmented Reality (AR)	
CS26	04/06/23	INVITED TALK	INVITED TALK
CS27	04/11/23	Towards Decomposable Interactive Systems – bio design interfaces; Decomposable materials-based interface design	
CS28	04/13/23	Do You See What I Hear? An Interaction Technique for Sound Zones	
CS29	04/18/23	Drone in Love: Emotional Perception of Facial Expression on Flying Robots	

CS30	04/20/23	Metaverse, HCI and Its Future	
CS31	04/25/23	QUIZ 3	QUIZ 3
CS32	04/27/23	FINAL SUBMISSION/REVIEW	FINAL SUBMISSION

Enrollment Requirement

Prerequisite(s): Degree- or nondegree-seeking graduate student.

Grading Policy

Requirement	Percentage Division
Class participation	10%
Quiz (3)	15%
Hands-on Group Project (2 Phases)	30%
Final Demo (Video/Prototype)	35%
Final Report	10%

Grade	Percentage
A+	100-97
A	96-93
A-	92-90
B+	89-87
B	86-83
B-	82-80
C+	79-76
C	75-70
D	69-60
E	<60

Classroom Behavior Policy

The students are required to behave in a courteous manner. The use of recording devices, without explicit permission, is not permitted during class. Any violent or threatening conduct in relation to this class will be reported to the ASU Police Department and the Office of the Dean of Students.

Academic Integrity

Students in this class must adhere to ASU's academic integrity policy, which can be found at <https://provost.asu.edu/academic-integrity/policy>. Students are responsible for reviewing this policy and understanding each of the areas in which academic dishonesty can occur. In addition, all engineering students are expected to adhere to the ASU Academic Integrity Honor Code. All academic integrity violations are reported to the Fulton Schools of Engineering Academic Integrity Office (AIO). The AIO maintains record of all violations and has access to academic integrity violations committed in all other ASU college/schools. Specific academic integrity announcements for this class are:

- You can discuss the assignments with other teams but all the submitted materials must be developed and prepared separately by the submitting student groups.
- You should be able to explain and justify the materials you submit as a group.
- Each individual team member should be able to describe their role in the submitted materials and show evidence for their work.
- Recommend sanctions for these violations will be a 0 grade on the related deliverable and/or reporting the violation to the AIO for their decision.

Student Copyright Responsibilities

You must refrain from uploading to any course shell, discussion board, or website used by the course instructor or other course forum, material that is not the student's original work, unless the student first complies with all applicable copyright laws; faculty members reserve the right to delete materials on the grounds of suspected copyright infringement.

The contents of this course, including lectures and other instructional materials, are copyrighted materials. Students may not share outside the class, including uploading, selling or distributing course content or notes taken during the conduct of the course. Any recording of class sessions is authorized only for the use of students enrolled in this course during their enrollment in this course. Recordings and excerpts of recordings may not be distributed to others. (see ACD 304–06, “Commercial Note Taking Services” and ABOR Policy 5-308 F.14 for more information).

Harassment and Sexual Discrimination

Arizona State University is committed to providing an environment free of discrimination, harassment, or retaliation for the entire university community, including all students, faculty members, staff employees, and guests. ASU

expressly prohibits discrimination, harassment, and retaliation by employees, students, contractors, or agents of the university based on any protected status: race, color, religion, sex, national origin, age, disability, veteran status, sexual orientation, gender identity, and genetic information.

Title IX is a federal law that provides that no person be excluded on the basis of sex from participation in, be denied benefits of, or be subjected to discrimination under any education program or activity. Both Title IX and university policy make clear that sexual violence and harassment based on sex is prohibited. An individual who believes they have been subjected to sexual violence or harassed on the basis of sex can seek support, including counseling and academic support, from the university. If you or someone you know has been harassed on the basis of sex or sexually assaulted, you can find information and resources at <https://sexualviolenceprevention.asu.edu/faqs>.

As a mandated reporter, I am obligated to report any information I become aware of regarding alleged acts of sexual discrimination, including sexual violence and dating violence. ASU Counseling Services, <https://eoss.asu.edu/counseling> is available if you wish to discuss any concerns confidentially and privately. ASU online students may access 360 Life services at <https://goto.asuonline.asu.edu/success/online-resources.html>.

Change Notice

Any information in this syllabus (other than grading and absence policies) may be subject to change with reasonable advance notice.

Other Information

If the instructor is absent for a class without prior notice, the students can leave after 15 min. Students may be directed to wait longer by someone from the academic unit if they know the instructor will arrive shortly.

**** DISCLAIMER ****

This syllabus is to be used as a guideline only. The information provided is a summary of topics to be covered in the class. Information contained in this document such as assignments, grading scales, due dates, office hours, required books and materials may be from a previous semester and are subject to change. Please refer to your instructor for the most recent version of the syllabus.