Course ID and Title: Human Subject Research in Software Systems
Units: 4 units
Term—Day—Time:
Spring 2023 MW - 6:00 - 7:50 pm

Location:
VHE 210

Instructor:
Name: Souti Chattopadhyay
Office: SAL 332
Office Hours: M 10-11, Th - 3-4
Contact Info: schattop@usc.edu

Teaching Assistant:
TBD
Office: [Physical or virtual address]
Office Hours:
Contact Info: [Email, phone number (office, cell), Skype, etc.]

IT Help:
Hours of Service:
Contact Info: [Email, phone number (office, cell), Skype]

Course Description
This course will provide an overview of the different quantitative and qualitative empirical research methods that can be used to improve software. This is a hands-on class that employs active learning. It is akin to an accelerated research class; students will work on a research problem throughout the semester that requires human subject research to investigate or solve a software/system related problem and by the end of the semester build an academic publication to report the findings. Students will become aware of the value of understanding the end users of software, gain the knowledge of accurately employing empirical methods to solve software engineering research problems, and learn to frame findings in academic format.

The class includes research methods for studying human-machine interactions and user interfaces; study design strategies; software evaluation methods; and related guidelines and standards.

Learning Objectives

Building good software systems requires an empirical investigation of the nature of the problem that the tool or approach solves and an evaluation of the tool or process itself. In this class, students will learn about the different research methods and how they can be used for a particular software development process or tool.

The goals are that by the end of this course, students will be able to:

1. Choose when a research method is a right choice for empirical work.

2. Design, conduct, and gather data in case studies...

3. ... according to accepted ethical principles of dealing with human subjects.

4. Synthesize findings using mixed (qualitative and quantitative) methods.

5. Report findings in the format of research publications.

Prerequisite(s): NA
Co-Requisite(s): NA
Concurrent Enrollment: NA
Recommended Preparation: NA

Course Notes

Grading type: Letter of Credit/No Credit.
The class will take place in traditional classroom format. Copy of the lecture materials and readings will be posted on Blackboard. Assignments and other required submissions may also make use of Blackboard. Exams will be in person, and are necessary, to facilitate students' ability to design. Specific exemptions about the mode of exams may be made under the discretion of the instructor.

Technological Proficiency and Hardware/Software Required

Most of the software required for the course are open source and free. Students will need to use Figma (free for education), RStudio (or R, now Posit), and Overleaf.
Additional information about how to access free versions of the products can be found at Software available to USC Campus. Students may choose to use advanced software like those included in Adobe Creative Cloud Suite, iMovie, and Aptana Studio.
Additionally, students might also find the following links useful: USC Computing Center Laptop Loaner Program, Zoom information for students, Blackboard help for students.

Required Readings and Supplementary Materials

1. Guide to Advanced Empirical Software Engineering, Shull et al., Springer, 2008. ISBN/SKU 9781848000438
(Will be referred to TB in schedule)

Other reading and supplementary materials associated with every week's topics will be provided by the instructor and linked in the detailed course schedule on the course website, and on blackboard.

Optional Readings and Supplementary Materials
1. Saldaña, J. (2009). The coding manual for qualitative researchers. Sage Publications Ltd.
2. Introductory Statistics with R. Peter Dalgaard
3. Experimentation in Software Engineering by C. Wohlin et al., Kluwer, 2000. ISBN 0-7923-8682-5

Description and Assessment of Assignments
Homework and Assignments:
There are 2 individual homework that will be focussed on ensuring the students understand the concepts of the research, and gain analysis skills needed. Additionally, there will be a series of assignments due weekly which include student studying and implementing the research methods and submitting required materials to show progress on solving their term research project. Groups can use their own graduate research project or choose a project in Software Engineering dealing with a problem around human subject interactions.

Exams:
There will be a midterm exam on materials covered until week 7, and a comprehensive final exam. Exams will be in-person.

Quizzes and In-class activities:
In-class activities include participation in the critique sessions, and other planned activities as part of the lecture. This activities will lead to higher engagement with materials, improve conceptual understanding, and promote collaboration among peers. Additionally, there will be 3 review quizzes focussed on the materials strategically placed to help students discover gaps in their understanding of the materials at different phases of problem solving and research.

Presentation and Project Report:
Each group will submit a final report in the form of an academic submission (IEEE/ACM conference style). Each group will also present their project similar to a conference presentation format. They will emphasize their methods, research tools, analysis procedure, findings, threats, and future directions.

Participation
Participation in in-class critique sessions (live or prepared), trainings, activities, and quizzes will constitute 5% of grade.

Grading Breakdown

Table 1 Grading Breakdown

Assessment Tool (assignments)	% of Grade
Homework/Assignments	20
Midterm	20
Final	20
Quizes/In-class activities	5

Presentation	15
Project Final Report	20
TOTAL	100

Grading Scale

Course final grades will be determined using the following scale:

Table 2 Course Grading Scale

Letter grade	Corresponding numerical point range
A	95-100
A-	90-94
B+	87-89
B	83-86
B-	80-82
C+	77-79
C	73-76
C-	70-72
D+	67-69
D	63-66
D-	60-62
F	59 and below

Assignment Submission Policy
Assignments should be submitted on blackboard (or in specific cases to a USC maintained folder) before 11:59pm on the due date.

Grading Timeline
Assignments will be graded within one to two weeks of submission.

Course Specific Policies
None

Attendance
In-class activity will constitute 5% of grades (see above for in-class activity description).
Student athletes with approved Travel Request Letters, students who give advance notice of religious or cultural observation, and students with approved medical leave documentations will be allowed to participate in at most 3 alternate activities/quizzes to make up for the grades lost due to attendance.

Classroom norms

This class is our community.

Every student should feel safe and welcome to contribute in this course, and it is all of our jobs to make sure this is the case. I will try to establish this tone whenever possible, but ultimately the responsibility for cultivating a safe and welcoming community belongs to the students - **that means you!**

Fortunately, forming a safe and welcoming community is not too hard. A good place to start is to recognize (and continually remind yourself) of the following facts:

- Your classmates come from a variety of cultural, economic, and educational backgrounds. Something that is obvious to you may not be obvious to them, and vice versa.
- Your classmates are human beings with intelligence and emotions. This applies even when one or the other of you is posting anonymously. Rudeness and disrespect are unprofessional, and have no place in this course or in your career.
- Your classmates are here to learn. They have the right to pursue their education without being distracted by others' disruptive behavior, or made uncomfortable by inappropriate jokes or unwanted sexual interest.

For additional resources, Refer to the CET resource, A menu of discussion norms.

Zoom etiquette

"Netiquette" or "internet etiquette," describes the recommended communication and behavior of online communication. Having a Zoom netiquette policy for your course can help minimize the chances of miscommunication and perceived disrespect. It is also recommended that you encourage students to contact you with questions or concerns about complying with a policy. For instance, if a student is unable to keep their camera on during the synchronous Zoom session, encourage them to contact you prior to the class session.

Academic Integrity

The University of Southern California is foremost a learning community committed to fostering successful scholars and researchers dedicated to the pursuit of knowledge and the transmission of ideas. Academic misconduct is in contrast to the university's mission to educate students through a broad array of first-rank academic, professional, and extracurricular programs and includes any act of dishonesty in the submission of academic work (either in draft or final form).

This course will follow the expectations for academic integrity as stated in the USC Student Handbook. All students are expected to submit assignments that are original work and prepared specifically for the course/section in this academic term. You may not submit work written by others or "recycle" work prepared for other courses without obtaining written permission from the instructor(s). Students suspected of engaging in academic misconduct will be reported to the Office of Academic Integrity.

Other violations of academic misconduct include, but are not limited to, cheating, plagiarism, fabrication (e.g., falsifying data), knowingly assisting others in acts of academic dishonesty, and any act that gains or is intended to gain an unfair academic advantage.

The impact of academic dishonesty is far-reaching and is considered a serious offense against the university and could result in outcomes such as failure on the assignment, failure in the course, suspension, or even expulsion from the university.

For more information about academic integrity see the student handbook or the Office of Academic Integrity's website, and university policies on Research and Scholarship Misconduct.

Please ask me if you are unsure about what constitutes unauthorized assistance on an exam or assignment, or what information requires citation and/or attribution.

For assignments marked individual submissions, you are expected to submit work that demonstrates your individual mastery of the course concepts.

Assignments and project work designated as a 'group project,' are expected to be completed with your respective groups.

Assignments that require you to complete computer programs, plagiarism includes the submission of code written by, or otherwise obtained from someone else.

If found responsible for an academic violation, students may be assigned university outcomes, such as suspension or expulsion from the university, and grade penalties, such as an "F" grade on the assignment, exam, and/or in the course.

Course Content Distribution and Synchronous Session Recordings Policies

USC has policies that prohibit recording and distribution of any synchronous and asynchronous course content outside of the learning environment.

Recording a university class without the express permission of the instructor and announcement to the class, or unless conducted pursuant to an Office of Student Accessibility Services (OSAS) accommodation. Recording can inhibit free discussion in the future, and thus infringe on the academic freedom of other students as well as the instructor. (Living our Unifying Values: The USC Student Handbook, page 13).

Distribution or use of notes, recordings, exams, or other intellectual property, based on university classes or lectures without the express permission of the instructor for purposes other than individual or group study. This includes but is not limited to providing materials for distribution by services publishing course materials. This restriction on unauthorized use also applies to all information, which had been distributed to students or in any way had been displayed for use in relationship to the class, whether obtained in class, via email, on the internet, or via any other media. (Living our Unifying Values: The USC Student Handbook, page 13).

Course Schedule

Table 3 Course schedule

	Topics/Daily Activities	Readings/Preparation	Deliverables (Due)
Week 1	01 Introduction to Empirical Software Engineering 02 Case study of empirical studies in SE	[Selecting Empirical Methods for Software Engineering Research](#) TB: Chapter 11	CITI certifications/training (RCR + HSR) (Individual) Form a project group
Week 2	01 Human Subject Study Methods and Structure 02 Conducting Surveys	TB: Chapter 3 Wohlin Section 1-3, Section 6 Ko et. Al Section 2	Project Proposal Research Questions
Week 3	01 Interviews 02 Critique Session: Surveys/Interview in papers	TB: Chapter 2	Data Collection Plan and Materials Research Method
Week 4	01 Qualitative analysis of Data 02 Triangulation and Mixed Methods Approaches	TB: Chapter 2	Findings from Formative Data collection: Interview/Survey Review Quiz: Weeks 1-3
Week 5	01 Introduction to User studies 02 Case studies of User Studies	Wohlin Section 4 Ko et. al. 3-8	Homework1: (individual) Case Study of Paper relevant research area
Week 6	01 Statistical Design for User Studies 02 Critique Session: User studies	TB: Chapter 6	Project Study Design Plan Recruitment Strategy
Week 7	01 Collecting and preparing data for studies 02 Statistical Analysis	Kitchenham et. Al.	In-class activity: mock study design and statistical analysis Review Quiz: 4-6
Week 8	Midterm week		
Week 9	Spring Recess		
Week 10	01 Statistical Analysis (cont.) and Case Study 02 Critique Session: Statistical Design in SE HSR studies		Homework2 (Individual): Statistics Assignment Sandbox and Pilot Report

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Week 4	01 Qualitative analysis of Data 02 Triangulation and Mixed Methods Approaches	TB: Chapter 2	Findings from Formative Data collection: Interview/Survey Review Quiz: Weeks 1-3
Week 11	01 Introduction to Observational and Field Studies 02 Case studies: Obs/ Field Studies in SE	TB: Chapter 1	Data Analysis and Findings from Sandbox and Pilot Conducting User Study Report
Week 12	01 Post hoc Analysis and Study Reframing 02 Critique Session: Live - Case Study of Twitter	Wohlin: Section 7	Initial Findings from User Study Post hoc Data Analysis, Hypothesis and Study Reframing
Week 13	01 Validity and Robustness, Case Studies of SE Research 02 Ethical Considerations for Various Software Subjects	TB: Chapter 9	Project Reframing: Threats to Validity, and Moving forward Review Quiz: 11-13.01 Term Project Paper Submission
Week 14	Group Presentations		Presentation Reports
Week 15	Group Presentations		Presentation Reports
FINAL	Refer to the final exam schedule in the USC *Schedule of Classes* at classes.usc.edu.		

Statement on Academic Conduct and Support Systems

Academic Integrity:
The University of Southern California is a learning community committed to developing successful scholars and researchers dedicated to the pursuit of knowledge and the dissemination of ideas. Academic misconduct, which includes any act of dishonesty in the production or submission of academic work, comprises the integrity of the person who commits the act and can impugn the perceived integrity of the entire university community. It stands in opposition to the university's mission to research, educate, and contribute productively to our community and the world.

All students are expected to submit assignments that represent their own original work, and that have been prepared specifically for the course or section for which they have been submitted. You may not submit work written by others or "recycle" work prepared for other courses without obtaining written permission from the instructor(s).

Other violations of academic integrity include, but are not limited to, cheating, plagiarism, fabrication (e.g., falsifying data), collusion, knowingly assisting others in acts of academic dishonesty, and any act that gains or is intended to gain an unfair academic advantage.

The impact of academic dishonesty is far-reaching and is considered a serious offense against the university. All incidences of academic misconduct will be reported to the Office of Academic Integrity and could result in outcomes such as failure on the assignment, failure in the course, suspension, or even expulsion from the university.

For more information about academic integrity see the student handbook or the Office of Academic Integrity's website, and university policies on Research and Scholarship Misconduct.

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Students and Disability Accommodations:

USC welcomes students with disabilities into all of the University's educational programs. The Office of Student Accessibility Services (OSAS) is responsible for the determination of appropriate accommodations for students who encounter disability-related barriers. Once a student has completed the OSAS process (registration, initial appointment, and submitted documentation) and accommodations are determined to be reasonable and appropriate, a Letter of Accommodation (LOA) will be available to generate for each course. The LOA must be given to each course instructor by the student and followed up with a discussion. This should be done as early in the semester as possible as accommodations are not retroactive. More information can be found at osas.usc.edu. You may contact OSAS at (213) 740-0776 or via email at osasfrontdesk@usc.edu.

Support Systems:

Counseling and Mental Health - (213) 740-9355 – 24/7 on call
Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

988 Suicide and Crisis Lifeline - 988 for both calls and text messages – 24/7 on call
The 988 Suicide and Crisis Lifeline (formerly known as the National Suicide Prevention Lifeline) provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week, across the United States. The Lifeline is comprised of a national network of over 200 local crisis

centers, combining custom local care and resources with national standards and best practices. The new, shorter phone number makes it easier for people to remember and access mental health crisis services (though the previous 1 (800) 273-8255 number will continue to function indefinitely) and represents a continued commitment to those in crisis.

[Relationship and Sexual Violence Prevention Services (RSVP)](#) - *(213) 740-9355(WELL) – 24/7 on call*
Free and confidential therapy services, workshops, and training for situations related to gender- and power-based harm (including sexual assault, intimate partner violence, and stalking).

[Office for Equity, Equal Opportunity, and Title IX (EEO-TIX)](#) - *(213) 740-5086*
Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants.

[Reporting Incidents of Bias or Harassment](#) - *(213) 740-5086 or (213) 821-8298*
Avenue to report incidents of bias, hate crimes, and microaggressions to the Office for Equity, Equal Opportunity, and Title for appropriate investigation, supportive measures, and response.

[The Office of Student Accessibility Services (OSAS)](#) - *(213) 740-0776*
OSAS ensures equal access for students with disabilities through providing academic accommodations and auxiliary aids in accordance with federal laws and university policy.

[USC Campus Support and Intervention](#) - *(213) 740-0411*
Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

[Diversity, Equity and Inclusion](#) - *(213) 740-2101*
Information on events, programs and training, the Provost's Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

[USC Emergency](#) - *UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call*
Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

[USC Department of Public Safety](#) - *UPC: (213) 740-6000, HSC: (323) 442-1200 – 24/7 on call*
Non-emergency assistance or information.

[Office of the Ombuds](#) - *(213) 821-9556 (UPC) / (323-442-0382 (HSC)*
A safe and confidential place to share your USC-related issues with a University Ombuds who will work with you to explore options or paths to manage your concern.

[Occupational Therapy Faculty Practice](#) - *(323) 442-2850 or* otfp@med.usc.edu
Confidential Lifestyle Redesign services for USC students to support health promoting habits and routines that enhance quality of life and academic performance.