

SYLLABUS for CHIP 490.387 – Human Factors in Healthcare, Fall 2023

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DAY & TIME	Wednesday, 5:45 – 8.30 PM via Zoom
OFFICE HOURS	By appointment
READINGS	Available on Sakai and the library.

OVERVIEW

Healthcare system performance is impacted by human capabilities and limitations and the affordance and constraints presented by system technology (hardware and software). As healthcare delivery processes and technologies become increasingly complex, human factors engineering has proven a powerful approach for proactively reducing harm.

Human Factors Engineering incorporates knowledge of human capabilities and limitations into systems to make them more efficient, effective, and safe. Understanding the role of healthcare workers [clinical and non-clinical], patients, and their families/care providers and their needs in the complex socio-technical healthcare system is vital for achieving a well-balanced human-system integration. Understanding their everyday performance variability and adaptation behaviors to respond to varying conditions helps identify the reason when things go right (Safety-II) versus when a rare safety event happens (Safety-I).

Human Factors in Healthcare course focuses on the use of human factors engineering methods to identify and mitigate system problems that cause human errors and patient safety hazards in healthcare. Basic principles and a variety of human factors tools are discussed and demonstrated through hands-on exercises and research projects.

LEARNING OBJECTIVES and OUTCOMES

Students will be able to apply human factors engineering, including its principles in healthcare setting.

Students will be able to evaluate product or process problems, using human factors engineering concepts and methods.

Students will be able to critique scientific articles and other readings on human factors engineering and synthesize knowledge from different areas of human factors engineering to solve a contemporary healthcare problem. a.

Students will be able to develop and communicate a research study proposal to apply human factors engineering in a healthcare context.

Reading Assignments

All reading materials are posted in Sakai. There is no required textbook for this course. All students are responsible for reading all the material posted in Sakai. The midterm exam and final exam will contain questions based on the reading material and lectures.

Evaluation

Individual presentation with questions for each class (10%). For each class, there will be an individual presentation and facilitated discussion (with or without slides) of the readings for that class (not just a summary). You should extract the important issues of the readings, critically analyze the readings, and, more importantly, pose discussion questions for class. The questions can be points of confusion, issues for further consideration, follow-up research ideas, and so on. You will be expected to raise some of your discussion points during class (see Class Participation).

Class participation (10%). You are expected to participate in the class discussions by sharing your discussion questions and by participating in the general discussion topic of the week. This is an essential part of the class. Please treat your classmates in a respectful manner by paying attention to the other students during discussions. Being silent throughout the semester **WILL** result in a 0 for this portion of your grade.

Individual Research Proposal (15%). The major class assignment is the project proposal that involves the evaluation, redesign, and testing of an existing system. More details are at the end of the syllabus. There are three parts to the group project, and each part is worth 10% of your final grade.

Individual Project Presentations (10%): Each student will present their proposal to the class. Class participation is critical in the discussion and Q&As.

Group Project (45%). The major class assignment is the project proposal that involves the evaluation, redesign, and testing of an existing system. More details are at the end of the syllabus. There are three parts to the group project, and each part is worth 10% of your final grade.

Group Project Presentation (10%). In the last few days of class, each group will formally present their project to the class and to their sponsor.

Grading: Grades for all assignments will be returned via Sakai. Individual assignment grades will combine to determine your final semester grade. Semester grades will follow the standard UNC grading system as outlined by the [Office of the University Registrar](#).

Undergraduate		Graduate	
Grade	%	Grade	%
A	97-100	H	95-100
A-	90-96	P	80-94
B+	87-89	L	70-79
B	83-86	F	0-69
B-	77-82		
C+	70-76		
C	60-69		
C-			
D+			
D			
F			

Policies

Participation

Class participation is a key element of this course. All students are expected to come to class prepared to be engaged, participate in all class exercises, and contribute to group discussions. In addition:

Be on time for class.

If you know in advance that you will miss a class, arrive late to class, or leave early from class, please let me know ahead of time.

If you miss class unexpectedly, please let me know why you were absent before the next class meeting.

Repeated absences or late arrivals will negatively impact your class participation grade.

If you don't understand something from class, **ask questions!** You can ask in class, you can stop by my office during office hours, or you can make an appointment to meet with me.

"Quality is better than quantity." Class participation is part of your grade for this course. However, there are many ways to participate.

Academic integrity and Diversity

UNC-Chapel Hill has had a student-administered honor system and judicial system for over 100 years. Because academic honesty and the development and nurturing of trust and trustworthiness are important to all of us as individuals, and are encouraged and promoted by the honor system, this is a most significant University tradition. You are responsible for being familiar with the UNC-Chapel Hill [Honor System](#).

If your team is having difficulty with some aspect of your project, please come to see me. One of the educational outcomes of this class should be an increase in your effectiveness in getting advice from more experienced colleagues.

The Honor Code, which prohibits giving or receiving unauthorized aid in the completion of assignments, is in effect in this class. The Instrument of Student Judicial Governance gives examples of actions that constitute [academic dishonesty](#). There are also some specific guidelines for this class:

You may give and receive assistance regarding the use of hardware and software.

You are welcome to work together on class preparation, discussing articles, walking through examples, working on exercises, etc. You may also ask your classmates for clarification of class notes.

All work you submit should be your own.

Individual homework assignments are to be done individually. You may consult the course readings and slides, your notes, and even other print or web sources. (Keep in mind, however, that what you find in other sources may not be consistent with what I want you to do.) You may not consult your classmates or other people; all questions should be addressed to me.

Team assignments are to be done as a team, with the team taking responsibility for all products. Work on the project should be distributed equitably among team members. I expect team members to discuss, consult, and even debate with each other about the project throughout the term.

In support of the University's diversity goals and the mission of the School of Information and Library Science, SILS embraces diversity as an ethical and societal value. We broadly define diversity to include race, gender, national origin, ethnicity, religion, social class, age, sexual orientation and physical and learning ability. As an academic community committed to preparing our graduates to be leaders in an increasingly multicultural and global society we strive to:

- Ensure inclusive leadership, policies, and practices
- Integrate diversity into the curriculum and research
- Foster a mutually respectful intellectual environment in which diverse opinions are valued
- Recruit traditionally underrepresented groups of students, faculty, and staff; and
- Participate in outreach to underserved groups in the State.

The statement represents a commitment of resources to the development and maintenance of an academic environment that is open, representative, reflective, and committed to the concepts of equity and fairness.

INDIVIDUAL RESEARCH PROPOSAL AND GROUP PROJECT

Overview

The course includes an Individual and Group, written assignment called a research proposal. A research proposal is a document that describes a specific research project – from the justification (why are you doing this?) to the research question(s), also known as a proposal statement (what will you investigate?), to the method (how are you doing this?) to limitations (what are you not doing, and why?). You can think of it as a document containing the introductory, background, and methods chapter of a regular thesis, e.g., a bachelor's or master's thesis, with a few extra bits at the end for limitations, contributions, and, of course, references.

All individual proposals will be shared with the class. A voting system will be conducted to select 4 individual proposals for group projects (See Group Project). The class will be divided into 4-teams to execute the proposals.

Individual proposal:

It is important to keep in mind that the actual empirical investigation(s) outlined in the proposals will not be conducted! A proposal, in general, is a detailed plan that is typically reviewed by a committee of senior faculty before the student can proceed with implementing the research.

Proposal requirements:

The overall topic of the proposal must be in line with the course syllabus. It must not be a topic that has been selected for this particular course iteration, and other topics may be permissible. These may include:

- Human factors field work methods in emerging settings
- Emerging topics in sensing, augmented reality, and virtual reality
- Technologies spanning personal and clinical computing
- Health and the Web
- Individual and team situation awareness
- Human-system integration
- Physical ergonomics issues and product design
- Cognitive task analysis
- Health literacy and numeracy in the context of human factors engineering
- Automation and trust in sociotechnical systems
- HCI models for health information technology

The scope of the research outlined in the proposal should be reasonable to complete in a semester for one student. The research should be feasible given the resources typically available to students conducting such project or thesis courses, although some creative liberties are allowed (e.g., assuming access to certain equipment, systems, environments, or study populations). As for the research itself, you have a lot of liberty in your choice. The research can be oriented towards a practical, domain-related problem or towards basic research. The methodology can be controlled experiments, field studies, ethnographic research, etc. The research may be quantitative or qualitative, hypothesis testing or exploratory. You are free to, within reason, choose your own method based on the nature of the question you ask (keeping in mind the feasibility criterium described previously). It is important to keep in mind that this is a research proposal, not a project proposal. You should in your work outline the academic value of conducting this particular research and try to position it within the broader literature on the topic. As such, you do not need to add project specifications such as number of work hours, budget or a time plan. The general criteria for the proposal can thus be summarized as follows:

The topic of the proposal must be relevant to the course syllabus, i.e. the scientific fields of human factors in healthcare
The proposal must outline an explicit and clear likely contribution to the scientific body of knowledge about the particular topic or question.

The proposed empirical investigation (e.g., study design) is suitable to answer the research question(s)

The proposal is feasible in that it could conceivably, with some assistance, be conducted by one master's student in one semester.

Proposal structure:

The written proposal should contain the following sections (page numbers are guidelines rather than limits):

- Title page
- Abstract (300 words)
- Introduction (1-2 pages)
- Background (2-3 pages)
- Research statement (one page)
- Method (2-3 pages)
- Limitations (1-2 pages)
- Contributions (1 page)
- References
- (Appendices)

The title page must list the proposal title, author name, course name, course code, date, and course instructor. The title must be informative of the proposed research and must not be longer than 25 words in length (including a subtitle, if applicable). The author's name should only appear on the title page.

The abstract should clearly and accurately summarize the research proposal in 300 words or less. The purpose, research question(s), method, and potential contributions should all be covered in the abstract. The abstract should appear on its own page.

The introduction should introduce the general topic to the reader and provide a high-level justification for the proposed research. This justification can either be grounded in a practical or domain-specific problem or a basic research-oriented problem. The introduction should be about one to two pages.

The background section should review prior peer-reviewed literature on the specific topic of research. This background section should be specific and relevant to the research statement. For example, it is more relevant to describe the knowledge gaps left by current studies than the history of the field. The background section should be ca 3-4 pages.

The research statement is the section where you explain what you propose to do. It should include the hypotheses or research questions derived from the reviewed literature in the background section. The statement should be specific and scientifically interesting. This section should be about one page.

The method section should be written in future tense and be very specific and detailed. In essence, this section should read as a detailed description of an already conducted study, although, of course, none has actually been conducted. Explicit references to design choices that are yet to be made can be included as long as the method for making that choice is outlined. For example, if you are proposing a planned experiment where you will play an auditory stimulus and you do not know how loud this stimulus must be you can explicitly state that the specific loudness (dB) will be determined through pilot testing. This section should include the usual headings for participants, apparatus, procedure, etc. (see the APA manual for additional headings typically used). The section should also include a subheading for the planned analyses and describe how those will be conducted. The length of this section may vary, but 2-4 pages is a guideline. Additional material (such as informed consent forms, questionnaires, balance sheets, software screenshots, manuscripts with instructions to read to participants, etc.) should be included in appendices.

The limitations section should detail the various planned as well as unavoidable limitations on the proposed research. This includes both the theoretical background, the scope of the research, and the methodological choices. This section should be about 1, perhaps 1-2 pages. The contributions section should outline the (likely, or potential) contributions the proposed research will achieve. This can, for instance, be answering specific research questions, discovering new knowledge about some phenomenon, or settling a conflict in prior research.

The contributions should be clearly outlined in relation to past research (as reviewed in the background section) and be generalized appropriately given the limitations. This section should be no more than one page in length.

Technical requirements:

The entire proposal should be about 8 to 10 pages in length (excluding title page, abstract, references and appendices) and written with Times New Roman, 12 pts, single line spacing. This is not a strict page limit but rather a general guideline that should fit most proposals. In general, brevity is preferred over wordiness, but the proposal must contain sufficient detail to be accurately graded.

The proposal should follow an accepted formatting guideline for the references. I recommend the [American Psychology Association's publication manual](#), version 6 (available as a reference work at the university library). Please be aware that online sources for the APA manual may be outdated! Always check that the information is correct according to the latest standard.

The proposal should be written in a clear and comprehensible manner. The text should have a logical flow and structure. Spelling mistakes and grammatical errors should be virtually nonexistent. The text should be written in a formal and technical language and avoid colloquialisms. Specific terminology should be used, and vague unsupported claims avoided. In short, the proposal should be written to a high academic standard as befitting a master's level course.

Grading rubric for the written proposal:

The grading rubric for the project report is available in Appendix B. There are seven criteria in the rubric for content, and three for mechanics. The proposal can either exceed, meet, or fail to meet the standard in each criterion. A holistic assessment is made based on how well the proposal meets these criteria. Proposals may receive a failing grade if they fail to meet key criteria, or if it receives a score of "No evidence" for any criteria.

Proposal presentation:

The proposals will be orally presented to the class by the individual students. The presentation should be about 15 minutes in length. The focus should be on the specifics of the research proposal (i.e., research statements, method, limitations, and contributions), with only a very brief presentation of the background. The presentation will be followed by a 5-minute Q&A session where the student will answer questions from the audience and the course instructor. To pass the oral presentation the student must present a clear overview of the topic to the general benefit of the audience, present their research proposal clearly and understandably, and keep within the allotted time frame.

Group Project:

It is important that the actual empirical investigation(s) outlined in the proposals will be conducted in this part. Your team will employ the "Methods" that you proposed in the proposal.

In this part, you will start data collection to perform the actual study.

Report Requirement

You will build on your "Individual Proposal". You will add the collected data, how you analyzed data, and the findings from data analysis to the report. This report documents your findings, recommendations, and justifications for the entire project.

Have one team member submit the final project report on Sakai

Report Structure

The final written proposal should contain the following sections added to the initial individual proposal report:

- Data Analysis
- Results
- Discussion
- Conclusion
- References - Updated

- (Appendices) - Updated

Technical Requirements

The entire proposal should be about 14 to 16 pages in length (excluding title page, abstract, references and appendices) and written in Times New Roman, 12 pts, single line spacing. This is not a strict page limit but rather a general guideline that should fit most proposals.

The same technical requirements apply to the final report.

Grading rubric for the final report

The same grading rubric is applied to the final report (refer to Appendix B).

Project Presentation

The project findings will be orally presented to the class by teams. The presentation should be about 15 minutes in length. The focus should be on the methods chosen, data analysis, and the findings, with only a very brief presentation on the background (as a refresher). The presentation will be followed by a 5-minute Q&A session where the student will answer questions from the audience and the instructor. To pass the oral presentation the student must present a clear overview of the topic to the general benefit of the audience, present their **research findings** clearly and understandably, and keep within the allotted time frame.