

# IE 684 – Health IT and Clinician Support Spring 2023

**Class Times:** TBD

**Room:** TBD

**Instructor:** Dr. Xiaomei Wang

**Office:** J.B. Speed, Room 307

**E-mail:** [xiaomei.wang@louisville.edu](mailto:xiaomei.wang@louisville.edu)

**Office Hours:** TBD

Or by appointment

**Website:** hosted on Blackboard

**GTA:** TBD

**Office:** TBD

**E-mail:** TBD

**Office Hours:** By appointment

**Textbook for reference (not required):**

Sethumadhavan, A., & Sasangohar, F. (Eds.). (2020). *Design for health: Applications of human factors*. Academic Press.

**Course Description:** This course provides students an overview of various types of health information technology (IT) systems, as well as strategies, methods, and tools used to support the work and health of clinicians. Topics are viewed through the lens of human factors engineering. This course also exposes students to applied tools and methods of the design and evaluation of health IT systems. Students will learn to use software to prototype high-fidelity, interactive user interfaces, and to conduct human factors evaluation on health IT systems based on the FDA guidelines (*Applying Human Factors and Usability Engineering to Medical Devices*). Documentation of such design and evaluation process will also be practiced with the semester project.

**Technology Requirements:** A mobile computer (laptop or tablet) computer is required for this course – you will need it for some of the exercises. One free interface prototyping software will be used beyond Microsoft Office (Word, Excel, PowerPoint).

**Contingency Plans:** If for any reason this class is transitioned fully to online, please make sure to check the Blackboard Announcement page and email everyday by 9:00am. In the event the instructor becomes ill, the GTA will lead the course until the instructor recovers. Quarantined or ill students will have online access and alternatives for completing coursework as needed. Please contact the instructor should you become quarantined or ill.

**Learning Objectives:** By the end of this course you will be able to:

- Demonstrate comprehension of different types of health IT systems
- Demonstrate comprehension of strategies, tools, methods to support clinician work and health
- Use software to prototype user interfaces

- Describe human factors methods that can be applied on the design and evaluation of health IT systems
- Conduct human factors evaluation on health IT systems
- Write a comprehensive report based on the project that documents design and evaluation of health IT tools

**Course Policies**

**Exams:** The mid-term exam may be moved forward or backward one class meeting.

**Attendance:** Due to the nature of this course, you are expected to attend every class. Class attendance will be taken during the semester. Multiple absences will be penalized.

**Late Work Policy:** Late work is acceptable with penalty before solutions and grades are posted. Late work from an excused absence or approved in advance is exempted from penalty.

**Make-up Policy:** Make-up exams are available if you have to miss a class for a *valid* reason. However, make-up exams must be requested and taken within two class periods of the original exam. The exam you take might not be the same as the original exam.

**Unethical Behavior:** Any student caught cheating or plagiarizing on the paper or exams will be dealt with according to Speed School of Engineering policy. Cheating and plagiarism are unpleasant situations for all of us, so please avoid unethical behavior.

**Accommodations:** Any student requiring special accommodations to facilitate learning and class participation should see me during the first week of class, or as soon as possible thereafter.

**Computer Issues and IT Support:** Speed IT staff are available by appointment from 9 am to 4 pm to assist you with your technology needs. You may schedule an appointment by sending a detailed email including any relevant error codes and screen snips at [SPDHelp@Louisville.edu](mailto:SPDHelp@Louisville.edu) (preferred) or 502-852-7620.

**Final Grade:**

Your final grade will be calculated from five scores: (1) Overall score for homework assignments, unannounced quizzes, attendance, in-class exercises (15%), (2) Midterm exam (10%), (3) Semester project (50%), and (4) Final exam (15%), (5) Extra assignments for graduate credit (10%).

Grades will be calculated on a 100-point scale with conversion to decimal grades based on the official University grading system. +/- letter grades will be used:

97-100	A+	77-79	C+
94-96	A	74-76	C
90-93	A-	70-73	C-
87-89	B+	67-69	D+
84-86	B	64-66	D
80-83	B-	60-63	D-
		<60	F

Title IX/Clery Act Notification

Sexual misconduct (including sexual harassment, sexual assault, and any other nonconsensual behavior of a sexual nature) and sex discrimination violate University policies. Students experiencing such behavior may obtain **confidential** support from the PEACC Program (852-2663), Counseling Center (852-6585), and Campus Health Services (852-6479). To report sexual misconduct or sex discrimination, contact the Dean of Students (852-5787) or University of Louisville Police (852-6111).

**Disclosure to University faculty or instructors** of sexual misconduct, domestic violence, dating violence, or sex discrimination occurring on campus, in a University-sponsored program, or involving a campus visitor or University student or employee (whether current or former) is **not confidential** under Title IX. Faculty and instructors must forward such reports, including names and circumstances, to the University's Title IX officer.

For more information, see the [Sexual Misconduct Resource Guide](#).

#### COVID-19 University Policy

As a Community of Care, all Cardinals are expected to abide by public health guidelines and regulations as published by the University. For Fall 2021, this includes:

- 1) wearing of cloth/paper masks (covering nose and mouth) when in shared indoor spaces like classrooms. (Per the July 2020 code of student conduct, a student who refuses to follow these guidelines may be asked to leave a classroom).
- 2) staying home when sick—any UofL community member experiencing fever, consistent dry cough, or other symptoms of contagious disease should remain at home until symptoms subside or advised that it is safe to return by a medical professional.
- 3) practicing good hygiene and responsibility for one's own surrounding.
  - a. Cover sneezes and coughs
  - b. Wash hands frequently with soap and water when possible, use hand sanitizer when soap and water are not available
  - c. Wipe down frequently touched surfaces
  - d. Maintain 6 feet physical distancing when possible

Faculty have the responsibility to help students meet these recommendations by:

- 1) SSoE instructors will allow students absent for reason of illness and/or quarantine to make up missed work and not penalize students for these absences
- 2) Notifying physical plant when classrooms are not adequately stocked with cleaning supplies and arranging classroom furniture or seating charts to maximize physical distancing where possible.

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***Tentative Course Schedule (subject to change)***

<b>Week</b>	<b>Topic</b>	<b>Project Activities</b>
1	Introduction to the class	Prepare software
2	Health IT systems overview, prototyping tool	Form teams
3	Engineering design process, FDA guidelines	Choose system for design
4	Electronic health record (EHR)	Initial design
5	Mobile health, wearable sensors	Prototyping with software
6	Telehealth	Prototyping continued
7	<b>Mid-term exam</b> , prototype design demonstration	Choose system for evaluation
8	Clinical decision support, electronic consultation	Document users, use environments, interface
9	Information visualization and big data	Known/possible issues
10	Re-design of lab results, after-visit summaries, prescription support	Critical Tasks
11	Care coordination and communication, workflow	Planning
12	Stress, fatigue, workload, burnout, interruption	Testing
13	Technology for special population	Analysis and writing
14	Frontiers of technologies: AI, VR/AR, robotics...	Reporting and presentation
15	Project presentations	
	<b>Final Exam</b>	