

## CS 6501-006 / SYS 6582-006: Human-CPS Interactions, Spring 2018

Instructor: Lu Feng ([lu.feng@virginia.edu](mailto:lu.feng@virginia.edu))

Office hour: noon-1 PM, Thursday, Olsson 271

### Description:

Many cyber-physical systems (CPS) are interactive, i.e., they interact with one or more human beings, and the human role is central to the correct working of the system. Examples of such systems include automobiles with “self-driving” features (interacting with a driver), remote-controlled drones (interacting with a ground operator), and medical devices (interacting with a doctor, nurse, or patient). This graduate course offers opportunities for students to get into research topics about the state-of-the-art in human-CPS interactions.

This course combines lectures with paper presentations by the students, encouraging both fundamental knowledge acquisition as well as open-ended discussions. Each student will also carry out a research project OR an in-depth literature survey.

### Prerequisites:

There are no official prerequisites but a knowledge of probability and multivariate calculus is expected.

### Grading:

- *Student Presentations (30%)*: Each student will get the opportunity to present multiple times. You will be graded based on your level of insight into the material (including how well you answer questions from us and the rest of the class), how well you relate the paper to other papers and lecture material, as well as how well you present the material to the class.
- *Paper Summaries (40%)*: Students are expected to write a summary of every paper discussed in class. There are 20 papers in total.
- *Final Project (30%)*: Students have a choice between a research project, and an in-depth literature survey (~50 relevant papers, organized by different features, identifying gaps in the state of the art). You will have a final presentation, and submit a proposal along the way (1 page) and a report (up to 5 pages) at the end.

Important: Despite these percentages, you will not pass this class if you don't submit a proposal and a final report for your project, if you don't present your final project, or if you don't show up for class regularly (even if your computed final score is above passing).

### List of topics (tentative):

- Human interaction with various CPS applications
  - Robots
  - Autonomous cars
  - Medical devices
  - Smart homes
- Requirements for Human-CPS Interactions
  - Trust
  - Safety
  - Security & Privacy
  - Ethics