

**Course Title: Special Advanced Course MECH 410B and 550R
Roboethics – Perspectives from Engineering (3 credits)**

Instructor: Reza Joghataie

This seminar-style course will provide students with an awareness of the current state of thinking of the design of robots that are meant to co-exist with people (service, therapy, military, sentry, etc.). The course will provide insight into how sociology, psychology, law, literature and design can contribute knowledge to arrive at a safe and effective co-existence between humans and machines that have some autonomy from their computational intelligence, i.e., robots. The course will examine the taxonomy of collaborative robots, the underpinnings of bioethics applied to technology, and several controversial robot application areas. The course will include a course project to allow students to explore a particular facet of roboethics in detail through designing, programming or evaluating simulated or actual robots or a human-robot interaction experience. Students will select their project through consultation with the instructors and considering their subjects of expertise and interest.

Prerequisites: Since the course is interdisciplinary, it is not expected that students have a background in any of the subjects of the course. Any math, physics or technical content will be explained in class in detail. However, depending on their background, students might need to study some references to become more familiar with and effectively learn some of the subjects.

Assessment: There will be class essays and presentations, and a final exam on the subjects discussed in class. Also, the final course project will be more extensive for graduate students than for undergraduate students.

Course Syllabus: Instead of running the normal 13 weeks of a full term, this course will be twice as intensive and only run half as long. Therefore, each of the Modules 1-6 below is a 1-week period. The last module is an assignment that must be completed by the end of the period of this course (Tuesday, June 19). The total timespan of classes with lectures is 6 weeks, from Tuesday, May 7 through Thursday, June 13, with the Assignments presented on the last day of the course, Tuesday, June 18. Classes are held Tuesdays and Thursdays 9:00 AM – 12:30 PM.

Course Schedule: The weekly modules are tentatively as follows:

1. Categorize and describe robots and application areas with respect to human interaction
2. Evaluate ethics principles and their application to technology, plus regulatory frameworks
3. Question the role of cultural differences in deploying robotics technology
4. Criticize the role of fiction in framing current thinking on collaborative robot usage
5. Analyze the use of robots in the military
6. Analyze the use of robots in the healthcare and social sectors
7. (Tuesday). Assignments presented in class.

Course Project: Evaluate one specific actual (product or research) robot and the ethical issues involved in its deployment. For example, a) listen to an outside or online lecture by an expert in roboethics in a specific field and write a paper on the topic; b) write a report that focuses on one specific roboethics topic in depth; or c) create a prototype/demo (blog, website, survey, VR experience, robot control program, etc.). Students will present their project on the last day of class, Tuesday, June 18, 2019.