**MAE 6770**

**Formal Methods for Robotics**

Prerequisites: Graduate standings or permission of instructor.

Fall. 3 credits. Graded, offered alternate years. First offered Fall 2017

How can we guarantee robots will never cause harm? How can we prove that complicated mechanical systems, controlled by computers and programmed by people, will always behave as expected under changing conditions and in a variety of uncertain environments? How do we formalize what such behaviors are? Guaranteeing safety, predictability and reliability of robots is crucial for the assimilation of such systems into society, be it at home or in the workplace. While every robotics researcher working with or on a robot is aware of safety issues, only recently the robotics community has begun looking at ways to either formally prove or guarantee by design different behavioral properties such as safety and correctness. This class will present recent results on the topic of formal methods for robotics and automation that combine and extend ideas from control theory, dynamical systems, automata theory, logic, model checking, synthesis, and hybrid systems.