AE 4803–Robotics and Autonomy

HOURS: 3-0-3

CATALOG DESCRIPTION:
Algorithms for control, planning and sensing for autonomous and robotics systems. Machine learning and AI methods for model learning and adaptation for robotics.

PREREQUISITES:
AE 3531

TEXTBOOKS (SUGGESTED):
Probabilistic Robotics, Sebastian Thrun, Wolfram Burgard, Dieter Fox, with Ronald C. Arkin (Ed.), MIT Press, 2005.
Additional course material:
Instructor notes.
Scientific papers from top conferences and journals in the area of robotics and autonomy.

COURSE OBJECTIVES:
Provide students with a foundational understanding of algorithms for control, planning and perception with applications to autonomous and robotic systems. These include: 1) methods for robot localization using Bayesian estimation, 2) planning algorithms such us motion primitives and Rapidly-Exploring Random Trees (RRTs), 3) predictive control algorithms, 4) machine leaning methods such us Deep Neural Networks and Gaussian Processes for model learning, adaptation and perception of robotics systems.

LEARNING OUTCOMES:
Student in this course will become familiar with:
1. Machine learning and Artificial Intelligence algorithms for autonomous systems
2. State estimation algorithms for localization autonomous systems
3. Control and planning algorithms for agile and autonomous navigation
4. Software and/or hardware platforms for testing and verification of machine learning, control and perception algorithms.

LEARNING ACCOMMODATIONS:
If needed, we will make classroom accommodations for students with documented disabilities. These accommodations must be arranged in advance and in accordance with the Office of Disability Services. (http://disabilityservices.gatech.edu).

ACADEMIC INTEGRITY:
Academic dishonesty is not tolerated. This includes cheating, lying about course matters, plagiarism, or helping others commit a violation of the Honor Code. Plagiarism includes reproducing the words or visual/graphical expressions of others without clear attribution and citation. Students are reminded of the obligations and expectations associated with the Georgia Tech Academic Honor Code, available online at http://osi.gatech.edu/content/honor-code.