Computing Science Course Outlines

CMPT 983 - G100 Special Topics in Artificial Intelligence

Instructor(s): Mo Chen

Instructor's Objectives:
This course introduces fundamental concepts in robotics and related fields, including analytical methods for decision making, and machine learning in the context of robotics. Topics include modelling and simulation of robotic systems, optimization, optimal control, robotic safety, reinforcement learning, and robotic perception. Applications of the material include unmanned aerial vehicles and self-driving cars.

Prerequisites:
None

Topics:
- Modelling and simulation
- Optimization
- Optimal control
- Robotic safety
- Reinforcement learning
- Robotic perception

Grading:
Assignments – 40% Project proposal – 10% Project presentation and report – 50%

Recommended Books:
- Introduction to Autonomous Mobile Robots, R. Siegwart, I. R. Nourbakhsh, and D. Scaramuzza, MIT Press, 9780262015356
- Planning Algorithms, S. M. LaValle, Cambridge University Press, 9780521862059
- Convex Optimization, S. Boyd and L. Vandenberghe, Cambridge, 9780521833783
- Dynamic Programming and Optimal Control, D. P. Bertsekas, Athena Scientific, 1886529434
- Reinforcement Learning: An Introduction, R. S. Sutton and A. G. Barto, MIT, 9780262039246

Academic Honesty Statement:
Academic honesty plays a key role in our efforts to maintain a high standard of academic excellence and integrity. Students are advised that ALL acts of intellectual dishonesty will be handled in accordance with the SFU Academic Honesty and Student Conduct Policies (http://www.sfu.ca/policies/gazette/student.html).