ROAI 2041 Robotics and AI

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Outline: This course provides a comprehensive introduction to Robotics and AI principles and technical methods, focusing on creating robots that interact with the physical world while possessing intelligent capabilities for learning, adaptation, and autonomous decision-making. Students will learn to design, control, and optimize robot systems using data-driven methods through both theoretical study and hands-on practice. The course covers essential knowledge and skills, ensuring students master these crucial competencies. Through practical assignments, students will implement these techniques on both simulated and real robot systems, gaining comprehensive hands-on experience.

The course covers key topics including robot kinematics and dynamics, optimal control, trajectory optimization, robot perception, reinforcement learning, imitation learning, embodied intelligence, and human-robot interaction.