ME 8287 Intermediate Robotics

ME 8287 Special Topics "Intermediate Robotics with Medical Applications"

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A 4.0 credit graduate course that surveys modern robotics with specific examples from surgical robotics. The goal is to equip students with theoretical and practical tools needed to engage modern robotics science at the interface between mechanisms and humans. This includes individual and group projects to computationally analyze, design, build, and evaluate real-world robots. Students in the course will:

- Learn alternative formulations for robot kinematics via matrix exponentials¹
- Shadow surgeons in the Operating Room to witness the pros and cons of modern surgical robots
- Review some mathematical foundations of systems theory and control (metrics, spaces, etc.)
- Optimize robot designs to achieve kinematic and dynamic task constraints
- Critically review literature from leading international robotics conferences
- Create conference paper submissions and presentations to participate in mock peer review
- Use Peter Corke's Robotics Toolkit to simulate robots in MATLAB²
- Do individual projects that can include topics or robots of your choice
- Do a final group project with a robot of your choosing. This will culminate in a live demonstration at an event open to the public.

Past group projects include a Hand Tattooing Robot, an Atraumatic Soft-Tissue Grasping Robot, and a Hydraulic Catheter Robot.