CS 656 – Advanced Robotics, Fall 2013

Instructor: Professor Marko Vuskovic, (mvuskovic@mail.sdsu.edu)

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Laboratory: Robotics and Neural Networks Laboratory, GMCS-408, Tel. (619) 594-7898

Lectures: MW 19:00 – 20:15, GMCS-314
Office Hours: MW 16:00 – 19:00
Web Site: http://medusa.sdsu.edu/Robotics/index.htm

Course Description:
Comprehensive treatment of algebraic methods for spatial description of solid objects in physical space, manipulator forward and inverse kinematics, differential motion, robot statics, Cartesian-space and model-based robot control.

Contents:
1. Review of basic concepts of robot manipulator design and manipulator kinematics
2. Review of mathematical concepts used in robotics
3. Spatial description and coordinate transformations
4. Direct kinematics
5. Inverse kinematics
6. Velocities, differential motion and manipulator Jacobian
7. Cartesian-based robot control
8. Robot statics (direct and inverse)
9. Model-based control

Grading Policy:
Five mini projects (40%)
Two midterm exams (60%)
Six in-class guided quizzes not graded but must be completed successfully.

The projects consist of a series of dependent parts which are building on top of each other. Necessary programming background is Matlab. All programming assignments are strictly individual and mandatory, and must be completed with a score of 60 or more. Programming assignments turned after the deadlines lose 10 points every business day.

Lab Assistants: Ravikanth Reddy GMCS-408, Tel. (619) 594-7898, ravikanthbreddy@gmail.com

Textual Material:
J. Craig: “Introduction to Robotics: Mechanics an Control”, Addison Wesley 3rd Ed. (Optional reading)