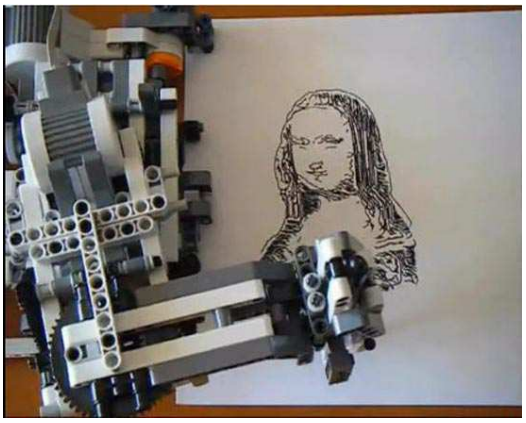
# Robotics with MATLAB and LEGO NXT

**Objective.** Teams of students will design, construct, and program (using MATLAB) LEGO-based robots in order to solve a variety of engineering problems. This entails learning to integrate analysis and design concepts from physics and mathematics with the fundamentals of programming to implement viable project designs. The projects may include catapult trajectory aiming, racing trajectory-following robots, robotic basketball, robotic art, digital scanner, etc.

**Course Structure.** Initially, each team will consist of two students providing an opportunity for each student to get familiar with the LEGO Mindstorms kit, review basic principles from mathematics and physics and learn the fundamentals of MATLAB programming. In the latter portion of the project sequence, students will break into teams of four to complete a capstone project. Capstone projects may be chosen from guidelines provided by instructors or student groups may submit their own capstone project design concept for instructor's approval. Homeworks and quizzes are an integral course component.

**Multi-disciplinary content.** There are several multidisciplinary aspects emphasized in these projects. Specifically, MATLAB programming is needed in all majors and the projects will reinforce material taught in the core course. System analysis and control spans disciplines which include mechanical, electrical, chemical, and civil engineering. The use of sensors and actuators is essential for system implementation in all engineering disciplines.



**For more information:**


- Dr. Stephen Konyk, stephen.konyk@villanova.edu
- Dr. Sergey Nersesov, sergey.nersesov@villanova.edu

- http://mindstorms.lfb.rwth-aachen.de/