322 B.C. - “If every tool, when ordered, or even of its own accord, could do the work that befits it... then there would be no need either of apprentices for the master workers or of slaves for the lords.” - Aristotle

1495 - Leonard da Vinci designs a mechanical clockwork that sits up, waves its arms, and moves its head.

1769 - Wolfgang von Kempelen builds “The Turk”, which gains fame as an automaton capable of playing chess - until the hidden human operator was discovered!

1921 - Karel Capek popularizes the term “robot” in a play called *R.U.R. (Rossum’s Universal Robots)* wherein robot workers take over the earth.
1942 - Isaac Asimov publishes *Runaround*, which introduces the three “laws” of robotics.

1951 - Raymond Goertz builds the first master/slave teleoperation system for handling radioactive material.

1954 - George Devol files a patent for the first programmable robot, and calls it “universal automation”.

1961 - *Unimate*, the first industrial robot, begins work on a General Motors assembly line.
“A robot is a reprogrammable, multifunctional manipulator designed to move material, parts, tools, or specialized devices through variable programmed motions for the performance of a variety of tasks.”

(The Robotics Institute of America)
Mechatronics is the synergistic combination of Mechanical engineering, Electrical engineering, Computer engineering, Control engineering, and Systems Design engineering in order to design and manufacture useful products.

-Wikipedia, Sept. 2010
Logistics
Locations

**Towne 303**
lecture room

**Towne 205**
door code: 4-2-1-9
18 stations
SolidWorks, programming

**Towne 193 (GM)**
card-swipe
19 stations
electronics, programming, SolidWorks, light fabrication, assembly

**Towne 167**
TA supervision required
laser cutting
Schedule

**Monday**  program overview, SolidWorks I, electronics I

**Tuesday**  teams, electronics II, SolidWorks II

**Wednesday**  embedded computing, programming in C I, mX introduction

**Thursday**  NASA Goddard field trip

**Friday**  programming in C II, mX details, project & documentation details

**Monday**  team brainstorm presentations, electronics III

**Tuesday**

**Wednesday**  Lockheed Martin field trip

**Thursday**

**Friday**

**Monday**

**Tuesday**

**Wednesday**  testing and interviews

**Thursday**  COMPETITION

**Friday**  public showcase, graduation luncheon
Online Resources

Course Wiki - http://medesign.seas.upenn.edu
Lab kits
solderless breadboard
hookup wire kit
small screwdriver
diagonal cutters
wire strippers (20-30 AWG)
(5) alligator-clip wires
(5) mini-grabber wires
coaxial banana-alligator wire
mini-B USB cable
2 oz. roll of 25-gauge 63/37 solder
Components (& Grading)

7 individual assignments (50%)
2 team assignments (15%)
1 final project (25%)
n quizzes (10%)