

**The Catholic University of America**  
**ENGR 207: Programming Robots and Sensors**  
**Course Syllabus**  
**Spring 2017**

**Instructor:** Dr. Artur Wolek  
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**Teaching Assistant:** Tsothe Kvelashvili  
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**Classroom:** Pangborn Hall, Room 207

**Class Meetings:** Monday and Wednesday 3:40 – 4:55 (75 minutes)

**Office Hours:** Monday and Wednesday after class, or by appointment

**Description:** An introduction to principles of robotic systems: types of robots and applications; locomotion; homogeneous coordinates; simulating equations of motion; stability and feedback control concepts; survey of sensor, actuator, and power technologies; key concepts in computer vision and motion planning. Assignments and labs will emphasize programming in MATLAB and Arduino.

**Primary Text:** Lectures notes posted to Blackboard

**Secondary Text:** R. Siegwart I. R. Nourbakhsh, and D. Scaramuzza, *Introduction to Autonomous Mobile Robots*, Second Edition, MIT Press, 2011.

**Arduino References:** J. Blum, *Exploring Arduino: Tool and Techniques for Engineering Wizardry*, John Wiley & Sons, 2012.  
(Available free from CUA library)

**YouTube Channel** <https://www.youtube.com/channel/UCCZX81KG8gsYqgcNJUrzi4w>

**Grading:** 40 % Homework  
15 % Mid-term Exam  
15 % Final Exam  
30 % Labs

**Course Policies:** <http://policies.cua.edu/academicundergrad/>

<b>Date</b>	<b>Section</b>
01/09 (M)	S1: Introduction to Robotic Systems
01/11 (W)	No class (Instructor Travel)
01/16 (M)	No class (Rev. Martin Luther King, Jr. Day)
01/18 (W)	S2: Locomotion
01/23 (M)	Lab 1: Arduino Basics
01/25 (W)	S3: Reference Frames and Transformations
01/30 (M)	S3: Reference Frames and Transformations
02/01 (W)	S4: Kinematics and Simulation
02/06 (M)	Lab 2: Sensors
02/08 (W)	S4: Kinematics and Simulation
02/13 (M)	S5: Sensors
02/15 (W)	S6: Uncertainty and Error Propagation
<b>02/21 (T)</b>	Lab 3: Actuators ( <b>Tuesday Class, due to Admin. Mon.</b> )
02/22 (W)	S6: Uncertainty and Error Propagation
02/27 (M)	<i>Buffer Day / Exam Review</i>
03/01 (W)	Mid-Term Exam
03/06 (M)	No class (Spring Recess)
03/08 (W)	No class (Spring Recess)
03/13 (M)	S7: Actuators
03/15 (W)	Lab 4: Mobile Robot Basics
03/20 (M)	S8: Control
03/22 (W)	No class (Administrative Friday)
03/27 (M)	S9: Computer Vision
03/29 (W)	Lab 5: Line following
04/03 (M)	S9: Computer Vision
04/05 (W)	S10: Motion Planning
04/10 (M)	S10: Motion Planning
04/12 (W)	Lab 6: TBD
04/17 (M)	No class (Easter Recess)
04/19 (W)	<i>Buffer Day / TBD</i>
04/24 (M)	S11: Advanced Topics
04/26 (W)	Exam Review