



Course: **ENPM809B – Building a Manufacturing Robotic Software System**
Semester: Spring 2018
Day(s): Monday
Time: 7:00-9:40 PM
Location: JMP 2121
Instructor: Dr. Craig Schlenoff Dr. Zeid Kootbally
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Course Description

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This hands-on course will look at the components of manufacturing robots, including knowledge representation, architectures, planning/control, simulation, measurement science, and safety. Students will explore the work that is being researched around the world in each of these areas, and will perform small hands-on exercises in most of the classes to gain a deeper understanding of how a selected set of these technologies can be applied to real-world challenges. This course will have invited presentations from experts in the field. The course will culminate in the development of a simulation-based control system that will address challenges presented in the Agile Robotics for Industrial Automation Competition (ARIAC) (www.nist.gov/ariac).

Prerequisites / Required Technology:

- Basic programming experience (C/C++)
- Laptop that can be brought to class for exercises and programming

Grading:

- In class quizzes (20% of overall grade)
- In class hands-on exercises / Homeworks (20% of overall grade)
- Final project (60% of overall grade)
 - Code/Implementation (with Status Checks) – 30%
 - Presentation – 15%
 - Report – 15%

Office Hours: Wednesday from 6:00pm-8:00pm via phone or Skype

Textbook(s)

- (required) “Programming Robots with ROS” by Quigley, Gerkey, and Smart, 1st Edition, 978-1449323899, O’Reilly Media, 2015.
- (optional) “Automated Planning, theory and practice” by Ghallab, Nau, and Traverso, 1st Edition, 978-1558608566, Elsevier, 2004.
- (optional) “Intelligent Systems: Architecture, Design, and Control” by Meystel and Albus. 1st Edition, 978-0471193746, Wiley 2001.



Course Outline

- Overview – Syllabus, Goal of Class, Agility, ARIAC Competition (Install Software)
- ROS Interfaces
- Robot Programming and ARIAC Interfaces
- State of the Art of Robotics
- Knowledge Representation
- Architectures
- High Level Planning
- Low Level Planning
- Simulation
- Measurement Science
- Safety/HRI

Code of Academic Integrity

The University of Maryland, College Park has a nationally recognized Code of Academic Integrity, administered by the Student Honor Council. This Code sets standards for academic integrity at Maryland for all undergraduate and graduate students. As a student you are responsible for upholding these standards for this course. It is very important for you to be aware of the consequences of cheating, fabrication, facilitation, and plagiarism. For more information on the Code of Academic Integrity of the Student Honor Council, please visit <http://shc.umd.edu/SHC/HonorPledgeInformation.aspx>.