

**Industrial Automation Systems  
ISE/SYS 5900 – Winter , 2018**

**Instructor:** Larry Osentoski

**Office Number:** 504, Engineering Ctr

**Office Hours:** By appointment

**Contact Info:**

Larry Osentoski 248-613-6738  
[ceo@drivedevelopments.com](mailto:ceo@drivedevelopments.com)

**Course Number and Course Title:** ISE/SYS 5900 Industrial Automation Systems

**Time and Place of Class Meetings:** Mondays and Wednesdays 7:30-9:17pm location Engineering Center 275 and the Sharf Laboratory in the Engineering Center (5<sup>th</sup> floor)

**Class Website:** <http://www.drivedevelopments.com/OU/SYS5900/WINTER2018.html>

\*\*\*\*\***CASE SENSITIVE WEBSITE LINK**\*\*\*\*\*

**Description of Course Content:** Students will develop the skills and strategies necessary for effective application of industrial automation in a variety of industrial settings. With particular emphasis on systems architecture, students will be provided an overview of techniques, technologies and tools required to effectively manage and develop industrial automation strategies and implementations. Topics include hierarchical relationships of automated controls from Human Machine Interfaces to the sensor level, developing team projects, effective use of leading edge technologies, one personal project and how to apply Plan Do Check Act (PDCA) to achieve truly lean automated solutions.

Prerequisite: None. Elective course.

**Course Objectives:**

1. Provide a general understanding of Automated Industrial Systems for the design and implementation of successful applications.
2. Explain the role and integration of technology vs. critical thinking within automated systems projects.

3. Focus on development of automated control systems within various industries.
4. Enable understanding of real-world situations through case studies and real world projects.

### **Student Learning Outcomes**

Upon completion of the course, students will be able to:

1. Demonstrate knowledge of hierarchy of automated controls design in various industrial settings.
2. Demonstrate the proper selection and use of technologies and tools for a given automated controls setting
3. Discuss how control design principles can be applied to various kinds of industries and companies of different sizes.
4. Explain why respect, trust and teamwork are the foundations of successful automated controls systems through working with key stakeholder and end-users throughout the design process

### **Required Textbooks and Other Course Materials:**

*Industrial Automated Systems: Instrumentation and Motion Control*, Terry L. M. Bartelt

**COURSE FORMAT:** The class will utilize a variety of industrial automation examples focused on relationship and interaction from field level interface to various supervisory systems. Class lectures will utilize a combination of the lecture method and case studies to foster discussions. Additionally, team projects will be reviewed weekly in-group roundtable setting.

**COURSE ELEMENTS:** The course will consist of readings and discussion from articles and course lecture materials. There will be regular homework assignments and a final exam. There will also be real world automation projects. All assignments must be typewritten and turned in at the beginning of the class on which they are due. No emailed or late assignments will be accepted. If there is a question as to a specific assignment, ask before it is due – not understanding the assignment is not a reason for not completing it.

**GRADING POLICY:** Your course grade is determined from a combination of the quizzes, team project, and final exam. Class participation and overall respect for the course are the best options for enhancing your grade. Each grade element is as follows:

Quizzes (10 quiz @ 15 points each)	150 points possible
Team Project	175 points
Final Exam	175 points

**Total**

**500 points**

Each of these elements is described in detail in the syllabus. If the requirements for this class are unclear, it is your responsibility to remedy the situation through an appointment with the instructor. Class time will be devoted to discussion of the critical topics. You are strongly encouraged to monitor your grades regularly to make sure that the scores for your assignments are recorded correctly. **DO NOT WAIT UNTIL THE END OF THE SEMESTER TO MAKE CORRECTIONS.** Tracking your scores should also help you to adjust your effort, if you are expecting a particular grade from this course.

<u>Percent of Points</u>	<u>Grade</u>
3.6-4.0	A
3.0-3.5	B
2.0-2.9	C
1.0-1.9	D
0.0	No credit

**Professionalism and Attendance:** A climate of cooperation and respect should permeate this course in order to create a professional environment. Professionalism is reflected in appropriate class behaviors, work ethics, and adequate completion of the course assignments. Professionalism will go a long way in establishing respect, from fellow students and the instructor. The instructor enjoys class discussion and often solicits input in a non-traditional fashion.

Due to the interactive nature of this class, attendance for the entire class period is crucial to success. Material missed due to class absence is your responsibility. Due dates on assignments are printed in the syllabus. There will be no make-ups on missed class work. If you are not able to make class it does not exempt you from turning in written assignments on time.

## Hierarchy of Industrial Automated Systems Syllabus (ISE/SYS 5900), WINTER 2018 CLASS SCHEDULE

Session #	Topic	QUIZ OR HOMEWORK DUE	Assignment / Comment
1/3/18	<b>Introduction to Industrial Automation Systems Part 1 of 2 ASSIGNMENT CH-1 : Intro to Industrial Control Systems</b>		
1/8/18	<b>Introduction to Industrial Automation Systems Part 2 of 2</b>		Intros and lab tour READ CH-1 : Intro
1/10/18	<b>Team Project Overview, Group Discussion on Team Selections</b>	QUIZ 1	Syllabus review; READ CH-15 : Industrial Process Control Techniques READ CH-27 : Industrial Networking
1/15/18	<b>***NO CLASS MLK DAY***</b>	*****	*****
1/17/18	<b>Teams Finalized; DC Motors</b>	QUIZ 2	READ CH-5.7thru5.10 : DC Motors
1/22/18	<b>AC Motors</b>		READ CH-6 : AC Motors
1/24/18	<b>Servo Motors</b>		READ CH-7 : Servo Motors
1/29/18	<b>DC Drives</b>		READ CH-8 : DC Drives
1/31/18	<b>AC Drives</b>		READ CH-9 : AC Drives
2/5/18	<b>Pressure Systems</b>	QUIZ 3	READ CH-10 : Pressure Systems
2/7/18	<b>Temperature Control</b>		READ CH-11 : Temperature Control
2/12/18	<b>Industrial Wireless Technologies</b>	QUIZ 4	READ CH-20 : Industrial Wireless Technologies
2/14/18	<b>Industrial Detection Sensors and Interfacing</b>	QUIZ 5	READ CH-19 : Industrial Detection Sensors and Interfacing
2/19/18	<b>*NO CLASS WINTER RECESS*</b>	*****	*****
2/21/18	<b>*NO CLASS WINTER RECESS*</b>	*****	*****
2/26/18	<b>Process Control Methods</b>	QUIZ 6	READ CH-17: Process Control Methods
2/28/18	<b>Intro to PLCs</b>	QUIZ 7	READ CH-21 : Intro to PLCs

3/5/18	<b>Fundamental PLC Programming</b>	QUIZ 8	READ CH-22 : Fundamental PLC Programming
3/7/18	<b>Adv. Programming, PLC Interfacing and Troubleshooting</b>	QUIZ 9	READ CH-23 : Adv. Programming, PLC Interfacing and Troubleshooting
3/12/18	<b>Siemens PLC Software</b>	QUIZ 10	
3/14/18	<b>Project Design</b>		LAB TIME
3/19/18	<b>Project Design</b>		LAB TIME
3/21/18	<b>Project Design</b>		LAB TIME
3/26/18	<b>Project Design</b>		LAB TIME
3/28/18	<b>Project Design</b>		LAB TIME
4/2/18	<b>Project Design</b>		LAB TIME
4/4/18	<b>Project Design</b>		LAB TIME
4/9/18	<b>Project Demonstrations</b>		
4/11/18	<b>Project Demonstrations</b>		
4/16/18	<b>Final Exam Review</b>		NO QUIZZES ALLOWED 4/12- 4/17
4/23/18	<b>Final Exam 7-10pm at Engineering Center 275</b>		