



**University of Tehran**  
**School of Electrical and Computer Engineering**

<b>Course:</b>	<b>8101309 – Industrial Control</b>									
<b>Course type:</b>	EE*						CE*			Credit: 3
	Com	E	P	B	Con	D	SW	HW	IT	
	Required	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Elective	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>Level:</b>	Undergraduate <input checked="" type="checkbox"/> Graduate <input type="checkbox"/>									
<b>Co-requisite(s):</b>	None.									
<b>Prerequisite(s):</b>	Linear Control Systems (8101224)									
<b>Prerequisite by topic:</b>	None.									
<b>Textbook(s):</b>	<p>[1] B. Wayne Bequette (Author), Process Control: Modeling, Design and Simulation, Prentice Hall; 1 edition (January 5, 2003).</p> <p>[2] Terry L.M. Bartle, Industrial Automated Systems: Instrumentation and Motion Control, Cengage Learning; 1 edition (June 8, 2010)</p> <p>[3] Frank Petruzella, Programmable Logic Controllers 4th Edition, McGraw-Hill Education; 4 edition (September 3, 2010).</p> <p>[4] Sunit Kumar Sen, Fieldbus and Networking in Process Automation, CRC Press (May 14, 2014)</p> <p>[۵] اصول و روشهای کنترل صنعتی- دکتر سید علی اکبر صفوی-۱۳۹۳</p> <p>[۶] مقدمه ای بر اتوماسیون و کنترل فرآیندهای صنعتی- دکتر حمید رضا تقی راد- ۱۳۸۸</p>									
<b>Coordinator:</b>	Kalhor, Professor, School of ECE									
<b>Goals:</b>	The goals of this course are understanding the typical applied control topics in industrial processes, familiarizing with some of the conventional processes, practical modeling, linearization methods, and the process control implementation platforms.									
<b>Outcome:</b>	<p>Upon successful completion of the course, students will be able to</p> <ol style="list-style-type: none"> <li>1. Get familiar with modeling concepts in liquids, thermal systems, and pressure.</li> <li>2. Be able to model systems, and get to see some practical considerations in designing PID, lead, and lag controllers.</li> <li>3. Get familiar with Advanced control loops in process control.</li> <li>4. Get familiar with some small and large scale control platforms such as DCS, PLC, SCADA and Fieldbus.</li> </ol>									
<b>Topics:</b>	<p>Process Control:</p> <ol style="list-style-type: none"> <li>1) Introduction to process control</li> <li>2) Definitions, Principles and Dimensions of a Process Control Problem</li> <li>3) Modeling of industrial process</li> </ol>									

	4) Liquid, thermal and pressure systems 5) Linearization and process identification 6) Linearization and identification of experimental models with time, frequency and data-driven methods 7) Tuning and implementation of classic controllers 8) Basic concepts, design methods, adjustment, and implementation 9) Advanced control loops 10) Feedforward and interactive loops, multivariable systems <b>Infrastructures of Process Control:</b> 1) PLC: Performance structure, component introduction and programming 2) Distributed control systems 3) Field bus
<b>Computer usage:</b>	MATLAB
<b>Assignments:</b>	4 to 7 homework assignments
<b>Projects:</b>	1 project
<b>Grading:</b>	Assignments: 15 % Projects: 15 % Midterm exams: 30 % Final exam: 40 %
<b>Further readings:</b>	
<b>Prepared by:</b>	Kalhor, Professor, School of ECE
<b>Date:</b>	1 September 2017

*EE: Electrical Engineering		CE: Computer Engineering	
Com	Communications	SW	Software
E	Electronics	HW	Hardware
P	Power	IT	Information Technology
B	Bioelectronics		
Con	Control		
D	Digital System		