



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

<b>Course:</b>	<b>8101001– Advanced Instrumentation</b>									
<b>Course type:</b>	EE*						CE*			Credit: 3
	Com	E	P	B	Con	D	SW	HW	IT	
	Required	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" 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>	Instrumentation									
<b>Prerequisite by topic:</b>	Physics, Microprocessor, circuit									
<b>Textbook(s):</b>	[1] Measurement and Instrumentation Principles Alan S. Morris [2] Handbook of Modern Sensors Jacob Fraden [3] Understanding Smart Sensors Randy Frank [4] Intelligent Systems -Fusion, Tracking and Control Dr Peter A. Cook									
<b>Coordinator:</b>	Abbasian, Professor, School of ECE									
<b>Goals:</b>	To understand the advanced techniques and theories relative to instrumentation.									
<b>Outcome:</b>	Upon successful completion of the course, students will be able to 1. Have knowledge for advanced technology for instrumentation 2. Can design Instrumentation electronics 3. Have knowledge for sensor fusion 4. Be familiar with smart sensor and their network protocols									
<b>Topics:</b>	1) Introduction to instrumentation, considering IPS 2) Review of important sensors (Temperature, Pressure, Density, Flow) 3) On Design of instrumentation electronics 4) Smart sensors and IEEE 1451 5) Mechatronics Design of a sensor 6) Advanced instrumentation communication protocol 7) Sensor Fusion									
<b>Computer usage:</b>	MATLAB									
<b>Assignments:</b>	3to 4 homework assignments									
<b>Projects:</b>	1,2 projects									
	Assignments: 20 %									

<b>Grading:</b>	Projects: 20 % Presentation: 30% Final exam: 30 %
<b>Further readings:</b>	[1] "Lessons in Industrial Instrumentation", Tony R. Kuphaldt, [2] Understanding Smart SensorsRandy Frank [3] Multi-Sensor Data Fusion:An IntroductionDr. H.B. Mitchell [4] Related Papers and Material from Web
<b>Prepared by:</b>	Abassian, Professor, School of ECE
<b>Date:</b>	23 August 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		