



University of Tehran
School of Electrical and Computer Engineering

Course:	8101062– Modern Control Systems									
Course type:	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"/>
Level:	Undergraduate <input checked="" type="checkbox"/> Graduate <input type="checkbox"/>									
Co-requisite(s):	None.									
Prerequisite(s):	Linear Algebra (8101174)									
Prerequisite by topic:	Differential Equation									
Textbook(s):	[1] Linear System- Theory and Design, Third Edition, C-T Chen, Oxford University Press, 1999.									
Coordinator:	Kebriaei, Professor, School of ECE									
Goals:	In this course, students will be introduced to LTI control system in state space form. Students will understand controllability, observability, stability of LTI systems and will be able to design state feedback controllers, observers and Kalman filters.									
Outcome:	Upon successful completion of the course, students will be able to 1. Understand the applications of the state space system representation. 2. Represent system model in minimal form. 3. Decomposition a system model to controllable and uncontrollable subsystems. 4. Decomposition a system model to observable and unobservable subsystems. 5. Design state observers and controller. 6. Place closed loop poles at desirable locations.									
Topics:	1) Linear algebra overview 2) State space representation 3) State space equation solution and diagonalization of LTI systems 4) Stability analysis of LTI systems 5) Controllability and observability of LTI systems 6) Realization theory 7) State feedback designing for LTI systems 8) Full-order and reduced order observer designing 9) Introduction to optimal control and Kalman filter									
Computer usage:	MATLAB									

Assignments:	4 to 6 homework assignments
Projects:	1 project
Grading:	Assignments And 20 % Projects: Midterm exams: 30% Final exam: 50 %
Further readings:	[1] اصول کنترل مدرن، تالیف دکتر علی خاکی صدیق، انتشارات دانشگاه تهران
Prepared by:	Kebriaei, Professor, School of ECE
Date:	24 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		