The University of Jordan
School of Engineering
Industrial Engineering Department
Fall 2019/2020

Course name:	Systems Dynamics and Control		
Course code:	IE0906345		
Credits hours	3		
Contact hours/room:	Section 1 :11-12 S T work shops 102 Section 2: 11:00 -12:30 M W Workshops101		
Course instructor's name, Email, and phone:	Prof. Mahmoud Barghash, mabargha@ju.edu.jo 22936		
Course Coordinator:	Prof. Mahmoud Barghash		
Text book:	Modern Control Systems Richard C. Dorf Robert H. Bishop Pearson, 2011, 12		
Other reference(s):	1) Katsuhiko Ogata, Modern control Engineering, 2002. 2) De Vegte, Feedback control systems 1992 . 3rd edition The open automation and control systems https://benthamopen.com/TOAUTOCJ/home/		
Course Description:	**2005 Course Catalogue Description** Systems dynamics and modeling. Time response of systems. System stability. Design and analysis of closed-loop control systems using root locus techniques. Control by microprocessors. System characteristics. PID controllers, open-loop and closed control of systems.		
Providing Department:	Industrial Engineering		
Prerequisite Course:	**Prerequisite:** Engineering Mathematics (1), **0301202**		
Course type	**Compulsory**		
Assessment Methods:	**Method**	**Weight %**	**Date**
	Homeworks	**10**	
	Mid Exam	**30**	
	Projects	10	
	Final Exam Course	**50**	

	#	After successful completion of this course, the student will be able to	SO
Course Learning Outcomes:	**CLO1**	Modelling of mechanical and electrical systems using transfer functions and block diagrams and reduction	2
	CLO2	Time response and assessment of control systems for percent overshoot rise time and steady state error	1
	CLO3	Using Root locus , Routh Hurwitz and Bode plot to design control systems to achieve required performance	4
	CLO4	Introduction to microcontrollers, for example Arduino to implement control systems controllers	2

	Week #	Topic
Brief list of topics	1-2	Introduction to control systems, Review of Laplace transform, solution of differential equations
	3-5	Modelling of electrical and mechanical systems, transfer functions, block diagrams and Reductions
	7	Matlab Representation, assessment and design of linear control systems
	8	Time response First order and second order systems, performance measures, percent overshoot, rise time, steady state error
	9-10	Control systems design, Root locus, Routh Hurwitz (Stability), Bode plot diagram
	11-12	Introduction to microcontrollers and implementation of control systems.
	13-end of semester	PID controllers and autotuning

Important Notes:	• Do not hesitate to ask questions • You are required to bring a notebook and take notes in classes. • Students are expected to attend every class session and they are responsible for all material, announcements, schedule changes, etc., discussed in class. • Discuss the assignments among yourselves • Don't Cheat; direct copying of others work will NOT be allowed or tolerated and will result in a reduction of grade. If you are found to be cheating in any way, on an exam or assignment, even signing the roll sheet for
	another student, you will be given an "F" for the course. There will be no exceptions. • All cases of academic dishonesty will be handled in accordance with university policies and regulations. JU policy requires the faculty member to assign ZERO grade (F) if a student misses 15% of the classes that are not excused, and 20% of the classes that are excused • Students are expected to be ready to take a quiz any time they have a class. There will be no make-up quizzes or home works. • Any students with disabilities who need accommodations in this course are encouraged to speak with the instructor as soon as possible to make appropriate arrangements for these accommodations.

The B.Sc. in industrial Engineering program enables students to achieve, by the time of graduation the following program learning outcome (SOs)

1	an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	*5*	*an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives*
2	an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors	*6*	*an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions*
3	*an ability to communicate effectively with a range of audiences*	*7*	*an ability to acquire and apply new knowledge as needed, using appropriate learning strategies..*
4	*an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts*		