The University of Jordan
School of Engineering
Industrial Engineering Department
2nd semester, 2024/2025

Course name:	Industrial Control systems
Course code:	**IE0906347**
Credits hours	3 hours / Theory
Contact hours/room:	11:30-12:30 S T Th, 11:30-1:300 M W lectures 10:30-11:30 S T Th (Open Hrs)
Course instructor's name, Email, and phone:	Prof. M. Barghash *mabargha@ju.edu.jo* *0096265355000 22936* IE department
Course Coordinator:	Prof. Mahmoud Barghash
Text book:	"Modern Control Systems" , Richard C. Dorf , Robert H. Bishop, Pearson, 2011, 12
Other reference(s):	1. "Modern Control Engineering ", 5th Edition, Katsuhiko Ogata , Prentice Hall. 2. "Control Systems Engineering", 6th Edition, Norman Nise, John Wiley.
Course Description:	**Course Catalogue Description** The course covers industrial control systems. The specific topics include: first and second order systems, Stability of dynamical systems. Frequency response, System identification, Servo systems, Design and tuning of a PID controller in closed loop systems. Practical applications in Process control systems, Simulation of control systems using MATLAB Simulink.
Providing Department:	Industrial Engineering
Prerequisite Course:	**Prerequisite:** Electrical Engineering Lab - **EE0903204**
Course type	**Compulsory / 3rd year course**
Teaching methodology	**Blended**
Assistant Electronic platform(s)	**Microsoft Teams**

	Method	Weight %	Date
Assessment Methods:	Quizzes	**20**	**Ann. later**
	Midterm Exam	**30**	**Ann. later**
	Projects		**Ann. later**
	Final Exam	**50**	**Ann. later**
	Total	**100**	

	#	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 auto-tuning

Important Notes:	**Attendance**: Students are expected to attend EVERY CLASS SESSION and they are responsible for all material, announcements, schedule changes, etc., discussed in class. The university policy regarding the attendance will be strictly adhered. **Make up Examinations:** There will be NO make-up exams for any exam that will be taken during the course. exceptions to this rule is restricted only to the following cases:- 1. Death of only first order. 2- Hospital entry (in-patient) during the time of the examination. Any other cases will be given the zero mark in the corresponding exam. **Special Notes:** 1. Students creativity is welcomed and will receive additional marks". 2. Please Follow the Health and safety procedures.

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*		