



Course:	Mechatronics System Design Laboratory – 0908562 (1 Cr. – Core Course)
Instructor:	Eng. Rasha Noufal <i>Office: MSD Lab, Mechatronics Engineering Department, 1st Floor</i> <i>Office Hours: Mon , Wed and Thursday 9:00-11:00AM</i> <i>Email: r.noufal@ju.edu.jo</i>
Course Website:	http://eacademic.ju.edu.jo/
Catalog Data:	This course intends to provide an understanding of Mechatronics System Design and their applications in real-life as well as in industries through hands-on practical projects. The Lab build upon the concepts learned in the course ‘Mechatronics System Design’. It begins by introducing students to the basic concepts of project and project stages, and then proceeds with providing an opportunity to build simple systems. The Lab also provides an opportunity to design and build sensor-based control systems as part of projects.
Prerequisites by Course:	<ul style="list-style-type: none">• Engineering Measurements – 0908341.• Control Systems - 0908441
Prerequisites By Topic:	The student should have the basic knowledge of measurement systems, control systems, electronics, programming and mechanics
Textbook:	Lab. Manual
References:	Notes and slides on the JU webspace.
Schedule & Duration:	13 Weeks, 13 lab sessions (3 hours each) plus exams.
Minimum Student Material:	Text book, class handouts, and an access to Personal Computer with MATLAB
Instructional Methods	<ol style="list-style-type: none">1. Pre-lab2. Conducting experimtns3. Writing Lab reports according to guidelines4. Conuct design project, submit final report, and present the work
Minimum College Facilities:	Classroom with whiteboard and projection display facilities, library, computational facilities with MATLAB and Simulink.
Course Objectives:	Upon successful completion of this Lab, the student should be able to: <ul style="list-style-type: none">• Define a Mechatronics System Design and state its purpose.• Perform practical tasks using Different types of controller PC, PID, PLC and Embedded• System to collect data from analog and digital devices.• Perform practical tasks using different types of controller PC, PID, PLC and Embedded• System to control different types of actuators (Electrical, Hydraulic and Pneumatic).• Build and test simple sensor-based control systems.

Course Learning Outcomes and Relation to ABET Student Outcomes:

Upon successful completion of this course, a student should:

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| 1 | you can list the types of user requirements specifications (URS) in mechatronic systems. | a , c |
| 2 | You can explain the principle of operation of the stepper motor and the servo motor. | k , l , c |
| 3 | You have improved your presentation skills, teamwork skills and problem solving skills due to the work on the experiments in this lab | g , d , e |
| 4 | You know how to design a mechatronic system. | a , c , k , l |
| 5 | You know how to select suitable types of sensor, driving circuit , condition circuit , controllers, control algorithms and actuators for mechatronic systems. | a , c , k , l |

ABET SO	a	c	d	e	g	k	l
Percentage of Course total marks	20%	10%	5%	10%	5%	20%	30%

Course Topics:

	Mechatronics System Design Lab:	Hrs
Lab Experiments		4
	Lab Experiments	9
Experiment 1: Principles of switching		
Experiment 2: Open-loop DC motor speed control		
Experiment 3: Stepper motor control		
Experiment 4: Simple calculator		
Experiment 5: Sequential control of a 3 cylinder		6
		3

Ground Rules:

- **Attendance:**

Students are expected to attend EVERY LAB 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 to.

Assessments:

Lab reports, Exam.

Grading policy:

Practical Experiments	25 %
Lab work	25 %
Final Exam	50 %
Total	100%

Last Updated:

Feb. 2017