مركز الاعتماد وضمان الجودة
ACCREDITATION & QUALITY ASSURANCE CENTER

Course Syllabus

1	**Course title**	Industrial Process Control	
2	**Course number**	0908586	
3	**Credit hours**	3	Elective Course
	Contact hours (theory, practical)	3 Theoretical Hours	
4	**Prerequisites/corequisites**	Digital Signals and System Analysis (0908483)	
5	**Program title**	B.Sc. in Mechatronics Engineering	
6	**Program code**	08	
7	**Awarding institution**	The University of Jordan	
8	**School**	Engineering	
9	**Department**	Mechatronics	
10	**Course level**	5	
11	**Year of study and semester (s)**	2nd Semester 2021/2022	
12	**Other department (s) involved in teaching the course**		
13	**Main teaching language**	English	
14	**Delivery method**	☐ Face to face learning ☐Blended ✓ Fully online	
15	**Online platforms(s)**	✓ Moodle ✓ Microsoft Teams ☐Skype ☐Zoom ☐Others……	
16	**Issuing/Revision Date**	10/10/2021	

17 Course Coordinator:

Name: Dr. Adham Alsharkawi	**Contact Hours:** Sunday-Thursday from 12:00 – 13:00
Office: Mechatronics Eng. Dep.	**Phone Number:** 5355000 Ext. 23030
e-mail: a.sharkawi@ju.edu.jo	

18 Other instructors:

19 Course Description:

This course unit aims to introduce students to the fundamental concepts of industrial process control, including cascade control, feedforward control, time delay compensation, and decouplers. It also aims to introduce students to model-based tuning methods, multivariable loop identification and digital sampling, filtering, and control.

20 Course aims and outcomes:

A. Aims:

The primary aim of this course is to introduce the students to the special characteristics of process dynamics and control in addition to modern and advanced control system tools.

B. Student Learning Outcomes (SLOs):

Upon successful completion of this course, students will be able to:

SLO(s) / SO(s)	SO (1)	SO (2)	SO (3)	SO (4)	SO (5)	SO (6)	SO (7)
Recognize the effect of each of the PID parameters on the dynamics of a closed-loop system.							
Describe the behavior of closed-loop system.							
Tune a PID controller using model-based design methods.							
Analyze the performance of a PID controller.							
Determine the difference between SISO and MIMO control problems.							
Design a digital PID controller							

21. Topic Outline and Schedule:

Week	Lecture	Topic	SLO	Platform	Synchronous / Asynchronous Lecturing	Evaluation Methods	Resources
1	1.1						
	1.2	Course Overview					
	1.3						
2	2.1	Introduction to Process Control (I)					
	2.2	Introduction to Process Control (II)					
	2.3	PID Control (I)					
3	3.1	PID Control (II)					
	3.2	PID Control (III)					
	3.3	PID Control (IV)					
4	4.1	PID Control (V)					
	4.2	Practical Considerations (I)					
	4.3	Practical Considerations (II)					
5	5.1	Controller Tuning					
	5.2	Model-based Design Methods (I)					
	5.3	Model-based Design Methods (II)					
6	6.1	Model-based Design Methods (III)					
	6.2	Model-based Design Methods (IV)					
	6.3	Enhanced Control (I)					
7	7.1	Enhanced Control (II)					

	7.2	Enhanced Control (III)					
	7.3	Enhanced Control (IV)					
8	8.1	Enhanced Control (V)					
	8.2	Multivariable Loop Identification (I)					
	8.3	Multivariable Loop Identification (II)					
9	9.1	Multivariable Loop Identification (III)					
	9.2	Multivariable Loop Identification (IV)					
	9.3	Digital Sampling, Filtering, and Control (I)					
10	10.1	Digital Sampling, Filtering, and Control (II)					
	10.2	Digital Sampling, Filtering, and Control (III)					
	10.3	Digital Sampling, Filtering, and Control (IV)					
11	11.1	Model Predictive Control (I)					
	11.2	Model Predictive Control (II)					
	11.3	Model Predictive Control (III)					
12	12.1	Course Project Presentations					
	12.2	Course Project Presentations					
	12.3	Course Project Presentations					
13	13.1	Course Project Presentations					
	13.2	Course Project Presentations					
	13.3	Course Project Presentations					
14	14.1						
	14.2						

	14.3						
15	15.1						
	15.2						
	15.3						

22 Evaluation Methods:

Opportunities to demonstrate achievement of the SLO(s) are provided through the following assessment methods and requirements:

Evaluation Activity	Mark	Topic(s)	SLO(s)	Period (Week)	Platform
Quiz	5	Practical Considerations		4th Week	Moodle
Midterm Exam	30	PID Control; Practical Considerations; Controller Tuning; Model-based Design Methods		9th Week	On-Campus
Quiz	5	Digital Sampling, Filtering, and Control		10th Week	Moodle
Project	20	Enhanced Control		11th Week	Moodle
Final Exam	40	All Topics			

23 Course Requirements

(e.g: students should have a computer, internet connection, webcam, account on a specific software/platform…etc):

Each student should have a computer (with MATLAB installed) and stable internet connection.

24 Course Policies:

- **Attendance:**

Students are expected to attend EVERY CLASS SESSION and they are responsible for all materials, announcements, schedule changes, etc., discussed in class.

- **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 relatives (father, mother, sister, or brother).
2. Hospital entry (inpatient) during the time of the examination.

Any other cases will be given the zero mark in the corresponding exam.

25 References:

Required book:

- Seborg DE, Edgar TF, Mellichamp DA, Doyle FJ. Process dynamics and control. John Wiley & Sons; 2017.

Recommended books:

- Polke M, editor. Process control engineering. John Wiley & Sons; 2008 Sep 26.

26 Additional information:

	Name	Signature	Date
Course Coordinator:	Dr. Adham Alsharkawi		
Head of Curriculum Committee/Department:			
Head of Department:			
Head of Curriculum Committee/Faculty:			
Dean:			