

1	Course title	Automation
2	Course number	090652
3	Credit hours	3
	Contact hours (theory, practical)	2 theoretical 3 practical
4	Prerequisites/corequisites	0906421 وضبط تخطيط الانتاج
5	Program title	Industrial Engineering
6	Program code	
7	Awarding institution	The University of Jordan
8	School	Engineering
9	Department	Industrial
10	Level of course	5
11	Year of study and semester (s)	2020/2021 first
12	Final Qualification	B.Sc.
13	Other department (s) involved in teaching the course	None
14	Language of Instruction	English
15	Teaching methodology	Blended Online
16	Electronic platform(s)	Moodle Microsoft Teams Skype Zoom Others.....
17	Date of production/revision	

18 Course Coordinator: Prof. Mahmoud Barghash

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19 Other instructors:

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Name:
Office number:
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Email:

20 Course Description:

As stated in the approved study plan.

Basic production concepts, analysis of serial production lines, assembly line balancing, computer numerical control, industrial robots, automated material handling systems, automated storage and retrieval systems. Lab experiments concentrate on familiarizing the student with the concepts studied in class and on PLC programming and applications.

21 Course aims and outcomes:

A- Aims:

To illustrate the basics of automation hardware and software

To illustrate the basics of automation technologies, robotics, automatic identification, automated storage and retrieval, automated and manual assemblies,

To illustrate the basics of manufacturing processes management types, automation types and the conversion from manual to automated lines.

B- Intended Learning Outcomes (ILOs):

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

CLO1	To be able to read machines electrical ladder diagrams including pneumatic sensors and pneumatic circuits	2
CLO2	To be able to do basic capacity analysis for the automation systems	4
CLO3	To be able to write simple CNC G-code programming	2
CLO4	To be able to express automation requirements into electrical and pneumatic circuits and PLC ladder logic	
	To understand line balancing problems and be able to apply it	2

22. Topic Outline and Schedule:

d	Lecture	Topic	Teaching Methods*/platform	Evaluation Methods**	References
1	1.1	History of programmable logic controllers	Microsoft Teams	Quiz1	Programmable Logic Controllers, 2nd Edition
	1.2	Basics of relay logic	Microsoft Teams	Quiz1	James A. Rehg, Pennsylvania State University

2	2.1	Examples of automation systems	Microsoft Teams	Quiz1	Glenn J. Sartori 2009Pearson chapter 1
	2.2	Basic components of programmable logic controllers	Microsoft Teams	Quiz1	
3	3.1	Modular systems	Microsoft Teams	Quiz1	
	3.2	Modular systems	Microsoft Teams	Quiz2	
4	4.1	Basics of wiring, addressing and interfacing for PLC's	Microsoft Teams	Quiz2	
	4.2	Basics of wiring, addressing and interfacing for PLC's	Microsoft Teams	Quiz2	
5	5.1	Conversion from relay logic to PLC's	Microsoft Teams	Quiz2	

	5.2	PLC' communication	Microsoft Teams	Quiz3	
6	6.1	Inputs/ Output devices to PLC's	Microsoft Teams	Quiz3	Programmable Logic Controllers, 2nd Edition
	6.2	Inputs/outputs to PLC's	Microsoft Teams	Quiz4	James A. Rehg, Pennsylvania State University Glenn J. Sartori
7	7.1	Inputs/outputs to PLC's	Microsoft Teams	Quiz4	2009Pearson chapter 2
	7.2	Digital, binary, octal and hexadecimal systems	Microsoft Teams	Quiz4	Programmable Logic Controllers, 2nd Edition James A. Rehg, Pennsylvania State University Glenn J. Sartori 2009Pearson chapter 3
8	8.1	Look inside into the How PLC's function with practical examples	Microsoft Teams		Programmable Logic Controllers, 2nd Edition James A. Rehg, Pennsylvania

					State University Glenn J. Sartori 2009 Pearson chapter 4
	68.2	LOGO-PLC	Microsoft Teams		Lecture Notes
9	9.1	Times, counters			
	9.2	LOGO-PLC	Microsoft Teams	MID	
10	10.1	Times, counters			Lecture notes
	10.2	Pneumatics basics I	Microsoft Teams	Quiz5	
11	11.1	Pneumatics Basics II	Microsoft Teams	Quiz 5	Lecture notes

12	12.1	Computer numerical control II	Microsoft Teams	Quiz5	Automation, production systems and computer integrated manufacturing Mikell P. Groover Pearson, 4rth, 2015 Chapter 6
	12.2	Basics of Robotics and programming I	Microsoft Teams	Quiz5	Automation, production systems and computer integrated manufacturing Mikell P. Groover Pearson, 4rth, 2015 Chapter 7
13	13.1	Automatic Identification, barcodes , RFID I	Microsoft Teams	Quiz6	Automation, production systems and computer integrated manufacturing Mikell P. Groover Pearson, 4rth, 2015 Chapter 12
	13.2	Automatic Identification, barcodes , RFID II	Microsoft Teams	Quiz6	Automation, production systems and computer

					integrated manufacturing Mikell P. Groover Pearson, 4rth, 2015 Chapter 12
	13.2	Manual assembly times; batch production, Plant within a plant technologies	Microsoft Teams	Quiz6	Automation, production systems and computer integrated manufacturing Mikell P. Groover Pearson, 4rth, 2015 Chapter 14
14	14.1	Line assemblies	Microsoft Teams	Quiz6	Automation, production systems and computer integrated manufacturing Mikell P. Groover Pearson, 4rth, 2015 Chapter 15

	14.2	And flow line analysis			
15	15.1	Managerial aspects for automation I	Microsoft Teams	Quiz6	Automation, production systems and computer integrated manufacturing Mikell P. Groover Pearson, 4rth, 2015 Chapter 1 and 2
	15.2	Managerial aspects for automation I	Microsoft Teams	Quiz6	

- Teaching methods include: Synchronous lecturing/meeting; Asynchronous lecturing/meeting
- Evaluation methods include: Homework, Quiz, Exam, pre-lab quiz...etc

23 Evaluation Methods:

Opportunities to demonstrate achievement of the ILOs are provided through the following assessment methods and requirements:

Evaluation Activity	Mark	Topic(s)	Period (Week)	Platform
Quizes lab sheets	20	Shown above	Shown above	Microsoft teams
MID lab and theory	30	Shown above	Shown above	Microsoft teams
Final	50	Shown above	Shown above	Microsoft teams

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

Internet and computer

25 Course Policies:

A- Attendance policies:

According to university regulations

B- Absences from exams and submitting assignments on time:

Must provide reasonable acceptable reasons

C- Health and safety procedures:

D- Honesty policy regarding cheating, plagiarism, misbehavior:

Self discipline

E- Grading policy:

automated

F- Available university services that support achievement in the course:

None

26 References:

Automation, production systems and computer integrated manufacturing

Mikell P. Groover

Pearson, 4th, 2015

Programmable Logic Controllers, 2nd Edition

James A. Rehg, Pennsylvania State University

Glenn J. Sartori

2009 Pearson

27 Additional information:

Name of Course Coordinator: -----Signature: ----- Date: -----

Head of Curriculum Committee/Department: ----- Signature: -----

Head of Department: ----- Signature: -----

Head of Curriculum Committee/Faculty: ----- Signature: -----

Dean: ----- Signature: -----
