



The Hashemite University
Faculty of Engineering
Course Syllabus

Course Title:	Automation	Course Number:	110405441																		
Department:	Mechatronics Engineering Department	Designation:	Compulsory																		
Prerequisite(s):	Automatic Control– 110405331																				
Instructor:	Dr. Samer Mutawe	Instructor's Office:	E 3106																		
Instructor's e-mail:	Samerk@hu.edu.jo																				
Office Hours:	11:00-12:00 pm Sunday and Tuesday																				
Time:	10:00 AM - 11:00 AM Sun-Tue	Class Room:	E 2024																		
Course description:	This course aims to introduce students to methods for design of industrial automation systems. Emphasis is on integration of components, process developments, and practical methods.																				
Textbook(s):	Petruzella, Frank D. (2005). Programmable Logic Controllers. McGraw Hill Companies Inc																				
Suggested Reference Texts	<ul style="list-style-type: none"> • Groover, P. (2001). Automation, Production Systems, and Computer-Integrated Manufacturing. Prentice Hall, Inc. • W. Bolton (2000), Programmable Logic Controllers, Newnes. • John W. Webb and Ronald A. Resi (2004). Programmable Logic Controllers:Principles and Applications. Prentice Hall, Inc. 																				
Course objectives (Intended/ Course Learning Outcomes)	<ul style="list-style-type: none"> • Apply the knowledge of digital systems to analyze and manipulate PLC-based systems. • Identify and formulate PLC-based system to meet industrial requirements. • Broad education to understand the impact of engineering solutions in a global and societal context. • Use of digital logic tools such as timers, counters, and logic gates to manipulate and build PLC programs. 																				
Major Topics Covered:	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Topic</th> <th style="text-align: center;">No. of Weeks</th> <th style="text-align: center;">Contact hours*</th> </tr> </thead> <tbody> <tr> <td>Ch.1.programmable logic controllers overview</td> <td style="text-align: center;">2</td> <td style="text-align: center;">6</td> </tr> <tr> <td>Ch. 2. PLC Hardware Components</td> <td style="text-align: center;">2</td> <td style="text-align: center;">6</td> </tr> <tr> <td>Ch. 3. Number Systems and Codes</td> <td style="text-align: center;">1</td> <td style="text-align: center;">3</td> </tr> <tr> <td>Ch. 4. Fundamentals of Logic</td> <td style="text-align: center;">2</td> <td style="text-align: center;">6</td> </tr> <tr> <td>Ch.5. Basics of PLC Programming</td> <td style="text-align: center;">2</td> <td style="text-align: center;">6</td> </tr> </tbody> </table>			Topic	No. of Weeks	Contact hours*	Ch.1.programmable logic controllers overview	2	6	Ch. 2. PLC Hardware Components	2	6	Ch. 3. Number Systems and Codes	1	3	Ch. 4. Fundamentals of Logic	2	6	Ch.5. Basics of PLC Programming	2	6
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	Ch.6. Developing Fundamental PLC Wiring Diagrams and Ladder Logic Programs	2	6
	Ch7. Programming Timers	2	6
	Ch8. Programming Counters	2	6
	Total	15	45
*Contact hours include lectures and exams			
Class/laboratory schedule:	2 class sessions each week; 50 minutes each.		
Grading Plan(V):	Subject to change as per the instructor: The course would have two exams, and a final exam		
	First Exam	(20 Points)	Tuesday 26/2/2019
	Second Exam	(25 Points)	Tuesday 9/4/2019
	Project	(15 Points)	TBA
	Final Exam	(40 Points)	Will be announced by the registrar
Grading	The instructor does not scale individual assignments/exams/book reports/project. (Standard grading will be utilized e.g. 93%-100% and so on with 5 grades difference will result in a grade in the 'A' range). If the instructor deems additional work necessary by an individual or a group of individuals, he will approach the individual(s). DO NOT inquire about additional assignments.		
General Notes:	<ul style="list-style-type: none"> You are entirely responsible for material and announcements covered during any absence. Some materials for this course will be posted on the Blackboard, however some items will not be posted and visiting this site is in no way equivalent to attending class. Behavior in class is very important or you be dismissed from class. Passing grade must earn in all Lectures of this class. Prompt, regular attendance is necessary for the lecture, and the exams. There is no makeup for the First and Second exams, missing them will give you zero grade. Any students needing assistance because of any disabilities must notify the instructor, and follow established university procedures. 		
Disability	If you need special accommodations (for homework, tests, etc.), please bring the instructor the proper documentation from Disability Services.		
Honesty Policy	As mentioned above, all work should be your own. If you are required to work in teams, then collaboration will (would) be acceptable (for the project and homework). You are not allowed to get assistance from others who are not enrolled in this class or those who are not an integral part of your team. Please reference all information used in your responses appropriately. Failure to comply with the aforementioned honesty policy (including seemingly minor infractions) can result in a serious penalty. When in doubt, please ask the instructor. Be certain to review The Hashemite University Academic Honesty Code.		

Actions outside the Boundaries of Academic Honesty and Integrity

No set of written guidelines can anticipate all types and degrees of violations of academic honesty. To the extent that the examples below are not exhaustive, duly appointed representatives of the Watson School will judge each case according to its merits. They will be guided by the principle that academic dishonesty involves misappropriation of academic or intellectual credit to oneself or to the discredit of others. Instances of such dishonesty include:

A. Plagiarism

Presenting the work of another person as one's own work (including papers, words, ideas, information, computer code, data, evidence organizing principles, or style of presentation of someone else taken from the internet, books, periodicals, or other sources). Plagiarism includes:

- Quoting, paraphrasing, or summarizing without acknowledgement, even a few phrases failing to acknowledge the source of either a major idea or ordering principle central to one's own paper
- Relying on another person's data, evidence, or critical method without credit or permission
- Submitting another person's work as one's own
- Using unacknowledged research sources gathered by someone else.

B. Cheating on Examinations

Giving or receiving unauthorized help before, during, or after an examination. Examples include:

- Unauthorized collaboration of any sort during an examination
- Reading of an exam before it has been given
- Unauthorized use of notes, books, tapes, computers, or other aids during an examination
- Allowing another person to take an examination in one's place
- Looking at someone else's examination during the examination period
- Allowing another person to use one's own examination during the examination period
- Passing examination information to students who have not yet taken the exam

C. Multiple Submissions

Submitting substantial portions of the same work for credit more than once, unless there is prior explicit consent of the instructor(s) to whom the material is being or has been submitted.

D. Unauthorized Collaboration

Collaborating on projects, papers, computer programs, or other academic assignments that has been prohibited by the instructor.

E. Fabrication and Misrepresentation

Misrepresenting or fabricating material, including misleading citation of

sources as well as falsified or fabricated data or results from experiments or other analyses. Misrepresenting facts related to academic performance, including the justification of absences, late assignments, and other activities.

F. Forgery

Imitating another person's signature on academic documents (for example, an academic advising form or one's own paper that is signed with respect to the time of submission) or other official documents that have an effect on academic credit (for example, a medical form submitted in support of taking a make-up exam).

G. Sabotage

Deliberately impairing, destroying, damaging, or stealing another's work or working material. Examples include:

- Destroying, stealing, or damaging another's lab experiment, computer program, term paper, exam, or project
- Removing uncharged library material with the effect that others cannot use them
- Defacing or damaging library material with the effect that others cannot use them
- Hoarding or displacing materials within the library with the effect that others have undue difficulty using them
- Interfering with the operation of a computer system so it has an adverse effect on the academic performance of others.

H. Bribery

Offering or receiving any service or article with the purpose or effect of receiving a grade or other academic benefit that was not earned on the merits of the academic work.

Specific Outcomes of Instruction (Course Learning Outcomes):

After completing the course, the student will be able to:

1. Apply the knowledge of digital systems to analyze and manipulate PLC-based systems. **(a, e)**
2. Identify and formulate PLC-based system to meet industrial requirements. **(c, e)**
3. Broad education to understand the impact of engineering solutions in a global and societal context. **(a, c, e, k)**
 4. Use of digital logic tools such as timers, counters, and logic gates to manipulate and build PLC programs **(a, e, k)**

Student Outcomes (SO) Addressed by the Course:

#	Outcome Description	Contribution
General Engineering Student Outcomes		
(a)	an ability to apply knowledge of mathematics, science, and engineering	H
(b)	an ability to design and conduct experiments, as well as to analyze and interpret data	
(c)	an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	M
(d)	an ability to function on multidisciplinary teams	
(e)	an ability to identify, formulate, and solve engineering problems	H
(f)	an understanding of professional and ethical responsibility	
(g)	an ability to communicate effectively	
(h)	the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	
(i)	a recognition of the need for, and an ability to engage in life-long learning	
(j)	a knowledge of contemporary issues	
(k)	an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	M

Prepared by:	Dr. Samer Mutawe	Date:	13/Jan/2019
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