



University of Puerto Rico
Mayagüez Campus
College of Engineering
Department of Mechanical Engineering
Bachelor of Science in Mechanical Engineering



Course Syllabus

1. General Information:
Alpha-numeric codification: INME 4810 Course Title: Design and Techniques for Automation Number of credits: 3 Contact Period: Two hours of lecture and three hours of laboratory per week
2. Course Description:
English: Introduction to automatic assembly systems. Design of products for ease of assembly. Analysis and design of special purpose automated equipment for parts manufacture, assembly, packaging or general industrial automation. Design of automatic assembly systems and their integration using programmable logic controller technology.
Spanish: Introducción a los sistemas de ensamblaje automático. Diseño de productos para facilitar su ensamblaje. Análisis y diseño de equipo automático especializado para la manufactura de componentes, ensamblaje, empaque o automatización industrial general. Diseño de sistemas de ensamblaje automático y su integración utilizando tecnología de controladores lógicos programables.
3. Pre/Co-requisites and other requirements:
Prerequisites: INME 4055
4. Course Objectives:
Upon successful completion, students will be able to: <ul style="list-style-type: none">• Describe the different types of automatic assembly systems.• Propose re-design suggestions of products to make them easier to assemble than the original ones.• Specify, analyze and design special purpose automated components of systems for automation.• Program PLC's to control components in an assembly line.• Integrate automatic assembly components using programmable logic controller technology
5. Instructional Strategies:
<input checked="" type="checkbox"/> conference <input type="checkbox"/> discussion <input type="checkbox"/> computation <input checked="" type="checkbox"/> laboratory <input type="checkbox"/> seminar with formal presentation <input type="checkbox"/> seminar without formal presentation <input type="checkbox"/> workshop <input type="checkbox"/> art workshop <input type="checkbox"/> practice <input type="checkbox"/> trip <input type="checkbox"/> thesis <input type="checkbox"/> special problems <input type="checkbox"/> tutoring <input type="checkbox"/> research <input type="checkbox"/> other, please specify:
6. Minimum or Required Resources Available:
Programmable logic controllers, vibratory bowl feeder, robot, automatic assembly line and accessories and software.

7. Course time frame and thematic outline		
General Topics	Contact Hours	
Introduction	5	
PLC programming	5	
Justifying automation and its design process	4	
Design for product assembly	6	
Industrial robots, workstations, feeders and conveyors	7	
Sensors, actuators, and controls	4	
Exams	2	
Laboratory: Introduction to PLC's and PLC programming	6	
Laboratory: Redesign a product for ease of assembly	6	
Laboratory: Integration of a robot in the assembly system	6	
Laboratory: Operation of conveyors	6	
Laboratory: Vibratory bowl feeder	6	
Laboratory: Integration of sensors and actuators into the assembly systems	6	
Laboratory: Integration of the assembly line	9	
Total hours: (equivalent to contact period)	75	
8. Grading System		
<input checked="" type="checkbox"/> Quantifiable (letters) <input type="checkbox"/> Not Quantifiable		
9. Evaluation Strategies		
	Quantity	Percent
<input checked="" type="checkbox"/> Exams	2	0-100
<input checked="" type="checkbox"/> Final Exam	1	0-100
<input type="checkbox"/> Short Quizzes		0-100
<input type="checkbox"/> Oral Reports		0-100
<input type="checkbox"/> Monographies		
<input type="checkbox"/> Portfolio		
<input type="checkbox"/> Projects		
<input type="checkbox"/> Journals		
<input checked="" type="checkbox"/> Other, specify: Laboratory work and reports, Homework	Global	0-100
TOTAL:		100%
10. Bibliography:		
Textbook:		
Derby, S.J. (2018). <i>Design of automatic machinery</i> . USA: CRC Press.		
11. Law 51: The Comprehensive Educational Services Act for People with Disabilities:		
States that after identifying with the instructor and the institution, the student with disabilities will receive reasonable accommodation in their courses and evaluations. For more information, contact the Department of Counseling and Psychological services at the Office of the Dean of Students (Office DE 21) or call 787-265-3864 or 787-832-4040 x 3772, 2040 and 3864.		
12. Academic Integrity		
The University of Puerto Rico promotes the highest standards of academic and scientific integrity. Article 6.2 of the UPR Students General Bylaws (Board of Trustees Certification 13, 2009-2010) states that academic dishonesty includes, but is not limited to: fraudulent actions; obtaining grades or academic degrees by false or fraudulent simulations; copying the whole or		

part of the academic work of another person; plagiarizing totally or partially the work of another person; copying all or part of another person answers to the questions of an oral or written exam by taking or getting someone else to take the exam on his/her behalf; as well as enabling and facilitating another person to perform the aforementioned behavior. Any of these behaviors will be subject to disciplinary action in accordance with the disciplinary procedure laid down in the UPR Students General Bylaws.—

13. Certification 06-43 of the Academic Senate

"The academic guidelines for offering online courses," defines: Traditional face-to-face courses are those that have less than 25% of the course's regular contact hours via the Internet. Therefore, a three-credit course will be considered "face to face" if, of the 45 hours of regular contact, 11 or less are taught via the Internet. According to certification 06-43 of the Academic Senate, a course may include up to 25% of its total contact hours via the Internet. The objective of this is so that all professors have this alternative in the case of any unscheduled eventuality.

14. Sexual Harassment: Certification 130-2014-2015 states:

Sexual harassment in the workplace and in the study environment is an illegal and discriminatory act and is against the best interests of the University of Puerto Rico. All persons who understand they have been subject to acts of sexual harassment at the University of Puerto Rico may file a complaint and request that the institution investigate, where necessary, and assume the corresponding action by the university authorities. If the complainant is a student, he or she must refer his or her complaint to the Office of the Student Ombudsperson or that of the Dean of Students.

Revised: February, 2019