



University of Puerto Rico
 Mayagüez Campus
 College of Engineering
 Department of Mechanical Engineering
 M.S./Ph.D. in Mechanical Engineering



Course Syllabus

1. General Information:	
Alpha-numeric codification: INME 6021 Course Title: Engineering Systems Design I Number of credits: 3 Contact Period: Three hours of lecture per week	
2. Course Description:	
English: An introduction to the philosophy of problem recognition and design project formulation; practice in this activity through the actual formulation and completion of several small design projects or one large one.	
Spanish: Introducción a la filosofía de reconocimiento de problemas y formulación de proyectos de diseño. Práctica en estas actividades a través de la formulación y desarrollo de varios proyectos pequeños o uno grande.	
3. Pre/Co-requisites and other requirements:	
Pre-requisites or Co-requisites: INME 6001 and INME 6011 or Authorization of the Director of the Department	
4. Course Objectives:	
<ul style="list-style-type: none"> • Analyzing design problems. • Applying engineering techniques to design situations. • Evaluating design problems using computational tools. 	
5. Instructional Strategies:	
<input checked="" type="checkbox"/> conference <input type="checkbox"/> discussion <input checked="" type="checkbox"/> computation <input 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 checked="" type="checkbox"/> special problems <input type="checkbox"/> tutoring <input type="checkbox"/> research <input type="checkbox"/> other, please specify:	
6. Minimum or Required Resources Available:	
Classroom, projector	
7. Course time frame and thematic outline	
General Topics	Contact Hours
Introduction to the Optimal Design of Complex Mechanical Systems	7
Multi-objective Optimization, Dependent and Independent Variable Formulations	8
Global Approximation	5

Optimization of Mechanical Systems	6
Modeling and Simulation Techniques	6
Optimal Ride Comfort and Active Safety of Road Vehicles	5
Optimal Design of Hellical Spring & Interactive Optimization of a Flywheel	5
Exams and reviews	3
Total hours: (equivalent to contact period)	45

8. Grading System

Quantifiable (S/NS) Not Quantifiable

9. Evaluation Strategies

	Quantity	Percent
<input checked="" type="checkbox"/> Exams	2	40
<input checked="" type="checkbox"/> Final Exam	1	20
<input type="checkbox"/> Short Quizzes		
<input checked="" type="checkbox"/> Oral Reports	1	20
<input type="checkbox"/> Monographies		
<input type="checkbox"/> Portfolio		
<input checked="" type="checkbox"/> Projects	1	20
<input type="checkbox"/> Journals		
<input type="checkbox"/> Other, specify:		
TOTAL:		100%

10. Bibliography:

Textbook:

Ambrósio, Jorge A. C., and Peter Eberhard. 2009. Advanced Design of Mechanical Systems. New York: Springer. <http://dx.doi.org/10.1007/978-3-211-99461-0>. [Available via Springer eBooks, UPRM General Library Databases]

Other resources:

1. Mastinu, Giampiero, Gobbi, Massimiliano and Carlo Miano. 2006. Optimal Design of Complex Mechanical Systems. New York: Springer. <http://dx.doi.org/10.1007/978-3-540-34355-4>. [Available via Springer eBooks, UPRM General Library Databases] (**)
2. Richards, Keith L. 2012. Design Engineer's Handbook. Florida: CRC Press. <http://www.crcnetbase.com/ISBN/9781439892763>. [Available via MechanicalENGINEERINGnetBASE, UPRM General Library Databases]
3. Electronic resources available through the Library's website: <http://www.uprm.edu/library/cre/listdbsp.php?l=1&st=0&topic=77>.

** These books are key classic references and remain as the top books for the subjects covered in the course and there are no up-to-date textbooks to substitute these books.

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