



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



Course Syllabus

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| 1. General Information: Alpha-numeric codification: INME 4055 Course Title: Manufacturing Processes Number of credits: 3 Contact Period: Three hours of lecture per week |
| 2. Course Description: English: Different manufacturing processes and machine tools; influence of the method of fabrication upon the properties of materials; computer and numerical control of machine-tools; use of plastics. Spanish: Diferentes procesos de manufactura y herramientas de corte; influencia del método de fabricación en las propiedades de materiales; control numérico por computadora de herramientas de máquinas; uso de plásticos. |
| 3. Pre/Co-requisites and other requirements: Pre-requisites: INGE 4001 or INME 4107 |
| 4. Course Objectives: Upon successful completion, students will be able to: <ul style="list-style-type: none">• Distinguish between different types of casting and differentiate between their output product characteristics;• Identify, formulate, and solve bulk deformation processes of forging, rolling, extrusion, and drawing problems by applying principles of engineering, science, and mathematics (1);• Identify, formulate, and solve machining operations of turning, milling, and drilling problems via description of cutting tools used and applying principles of engineering, science, and mathematics (1);• Relate the common mechanisms of cutting tool wear to desirable cutting tool material properties;• State the advantages and physical description of the nontraditional material removal processes of waterjet machining, electric discharge machining, and chemical machining.• Examine a design drawing of a component and describe a feasible sequence of manufacturing processes for production of the component guided by ethical, environmental, and professional considerations (4);• Identify specific polymer processing methods based on material and component;• Find, evaluate and use resources to learn independently in the area of future manufacturing technologies (7). |
| 5. Instructional Strategies: <input checked="" type="checkbox"/> conference <input type="checkbox"/> discussion <input 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 type="checkbox"/> special problems <input type="checkbox"/> tutoring |

research other, please specify:

6. Minimum or Required Resources Available:

None.

7. Course time frame and thematic outline

| General Topics | Contact Hours |
|--|----------------------|
| Introduction to manufacturing | 2 |
| Review of materials science | 3 |
| Statistical process control | 2 |
| Process capability | 2 |
| Casting | 2 |
| Solidification and structures | 2 |
| Heat transfer on molds | 2 |
| Fluid flow | 2 |
| Review of behavior of materials and deformation | 4 |
| Bulk deformation | 2 |
| Joining Processes | 3 |
| Rolling | 3 |
| Forging | 2 |
| Extrusion | 2 |
| Composite materials manufacturing | 2 |
| Introduction to polymer processing | 3 |
| Microfabrication and interconnections | 2 |
| Tests | 3 |
| Total hours: (equivalent to contact period) | 45 |

8. Grading System

Quantifiable (letters) Not Quantifiable

9. Evaluation Strategies

| | Quantity | Percent * |
|---|-----------------|------------------|
| <input checked="" type="checkbox"/> Exams | 2-3 | 50-75 |
| <input checked="" type="checkbox"/> Final Exam ** | 1 | 0-25 |
| <input checked="" type="checkbox"/> Short Quizzes | 0-3 | 0-10 |
| <input checked="" type="checkbox"/> Oral Reports | 0-4 | 0-25 |
| <input type="checkbox"/> Monographies | | |
| <input type="checkbox"/> Portfolio | | |
| <input checked="" type="checkbox"/> Projects | 0-1 | 0-50 |
| <input type="checkbox"/> Journals | | |
| <input checked="" type="checkbox"/> Other, specify: Homework | 0-5 | 0-25 |
| TOTAL: | | 100% |

* All evaluation strategies will add to 100%

** In design courses a capstone project may replace the final exam.

10. Bibliography:

Textbook:

Groover, M. P. (2015). *Fundamentals of Modern Manufacturing: Materials, processes and systems*. Wiley.

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