University of Puerto Rico  
Mayagüez Campus  
College of Engineering  
Department of Electrical and Computer Engineering  
Bachellor of Science in Electrical Engineering

**Course Syllabus**

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| **1. General Information:** |
| Alpha-numeric codification: INEL 4405 Course Title: Electrical Machines Number of credits: 3 Contact Period: 45 |
| **2. Course Description:** |
| English: Electromechanical energy conversion ; induction, synchronous and direct current machines are studied |
| Spanish: Conversión electromecanica de energía; maquinas de inducción, sincrónicas y de corriente directa son estudiadas |
| **3. Pre/Co-requisites and other requirements:** |
| INEL 4103 |
| **4. Course Objectives:** |
| To introduce students to the fundamental concepts of electromechanical energy conversion and electric machines. After completing the course , the students will have a solid background on the construction, operation characteristics and the analysis of each of the electrical machines discussed |
| **5. Instructional Strategies:** conference discussion computation laboratory seminar with formal presentation seminar without formal presentation workshop art workshop practice trip thesis special problems tutoring research other, please specify: There will be laboratory demonstrations throughout the semester. Students must attend these demonstrations during the regular class period. Material from these demonstrations will be part of the class, and thus will be evaluated. Students may be asked to collect data from these demonstrations, analyze it and submit a report with the results of the analysis. |
| **6. Minimum or Required Resources Available:** |
| All students are expected to bring a solid background in circuit analysis and calculus. Students should also have basic knowledge of electromagnetic theory. Students must always bring to class the textbook and a scientific calculator (preferably one that handles complex numbers). |
| **7. Course time frame and thematic outline** |
| |  |  | | --- | --- | | **Outline** | **Contact Hours** | | Review of Magnetic circuits, Concept of self and mutual |  | |

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| |  | | --- | | inductances | | Electromechanical energy conversion principles | | Concepts,types and construction of basic rotating machines | | Three phase induction machines | | Single phase induction motors | | Synchronous machines | | Direct current machines | | Exams | | **Total hours: (equivalent to contact period)** | |
| **8. Grading System** |
| Quantifiable (letters) Not Quantifiable |
| **9. Evaluation Strategies** |
| |  |  | | --- | --- | | **Quantity** | **Percent** | | **Exams** | **3** | **60** | | **Final Exam** | **1** | **40** | | **Short Quizzes** | **\_\_\_\_\_** |  | | **Oral Reports** |  |  | | **Monographies** |  |  | | **Portfolio** |  |  | | **Projects** |  |  | | **Journals** |  |  | | **Other, specify: Homework** | **\_\_\_\_\_** |  | | **TOTAL:** | **100%** |  | |
| **10. Bibliography:** |
| Textbook: Bhag S. Guru, Huseyin R. Hiziroglu, Electric Machinery and Transformers, Third Edition, Oxford Press, 2001 References: Theodore Wildi, Electrical Machines, Drives, and Power Systems, Third Edition, Prentice Hall, 1997 Donald V. Richardson, Arthur J. Caisse,Jr.,Rotating Electric Machinery and Transformer Technology, Fourth Edition, Prentice Hall, 1997 |
| **11. According to Law 51** Students will identify themselves with the Institution and the instructor of the course for purposes of assessment (exams) accommodations. For more information please call the Student with Disabilities Office which is part of the Dean of Students office (Chemistry Building, room 019) at (787)265-3862 or (787)832-4040 extensions 3250 or 3258. |

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| **12. Course Outcomes** | **Map to Program Outcomes** |
| 1. Possess sufficient knowledge of circuit analysis and electromagnetic principles to enable understanding of the physical operation of electric machines | (a) |

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| 2. Be able to apply linear algebra and phasor analysis concepts to descriptions and solutions of steady state electric machines engineering problems. | (a) |
|  | (a) |
| 4. Be capable of physical thinking, approximation and simplification of electric machines behaviour as to perform laboratory test to compare actual results with theoretical ones | (b) |
| 5. Be capable of effectively describing electrical machines steady state working conditions in a way that can lead to the construction of a solution. | (e) |
| 6. Be capable to use the existing data acquisition module and computer programs to obtain and analyze the electric machines operation characteristics | (k) |
| 7. | (e) |
| 8. | (e) |
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