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 4405Course Title: Electrical MachinesNumber of credits: 3Contact Period: 45 |
| **2. Course Description:** |
| English: Electromechanical energy conversion ; induction, synchronous and direct currentmachines are studied |
| Spanish: Conversión electromecanica de energía; maquinas de inducción, sincrónicas yde 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 andelectric machines. After completing the course , the students will have a solid background on theconstruction, operation characteristics and the analysis of each of the electrical machinesdiscussed |
| **5. Instructional Strategies:**conference discussion computation laboratoryseminar with formal presentation seminar without formal presentation workshopart workshop practice trip thesis special problems tutoringresearch other, please specify: There will be laboratory demonstrations throughout thesemester. Students must attend these demonstrations during the regular class period. Materialfrom these demonstrations will be part of the class, and thus will be evaluated. Students may beasked to collect data from these demonstrations, analyze it and submit a report with the results ofthe 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 mustalways bring to class the textbook and a scientific calculator (preferably one that handlescomplex numbers). |
| **7. Course time frame and thematic outline** |
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| **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)** |

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| **8. Grading System** |
| Quantifiable (letters) Not Quantifiable |
| **9. Evaluation Strategies** |
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| **Quantity**  | **Percent** |
| **Exams**  | **3**  | **60** |
| **Final Exam**  | **1**  | **40** |
| **Short Quizzes**  | **\_\_\_\_\_** |  |
| **Oral Reports** |  |  |
| **Monographies** |  |  |
| **Portfolio** |  |  |
| **Projects** |  |  |
| **Journals** |  |  |
| **Other, specify:Homework** | **\_\_\_\_\_** |  |
| **TOTAL:**  | **100%** |  |

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| **10. Bibliography:** |
| Textbook:Bhag S. Guru, Huseyin R. Hiziroglu, Electric Machinery and Transformers, Third Edition,Oxford Press, 2001References:Theodore Wildi, Electrical Machines, Drives, and Power Systems, Third Edition, Prentice Hall,1997Donald V. Richardson, Arthur J. Caisse,Jr.,Rotating Electric Machinery and TransformerTechnology, Fourth Edition, Prentice Hall, 1997 |
| **11. According to Law 51**Students will identify themselves with the Institution and the instructor of the course forpurposes of assessment (exams) accommodations. For more information please call theStudent with Disabilities Office which is part of the Dean of Students office (ChemistryBuilding, room 019) at (787)265-3862 or (787)832-4040 extensions 3250 or 3258. |

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| **12. Course Outcomes**  | **Map toProgramOutcomes** |
| 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 todescriptions and solutions of steady state electric machinesengineering problems. | (a) |
|  | (a) |
| 4. Be capable of physical thinking, approximation andsimplification of electric machines behaviour as to performlaboratory test to compare actual results with theoretical ones | (b) |
| 5. Be capable of effectively describing electrical machines steadystate working conditions in a way that can lead to theconstruction of a solution. | (e) |
| 6. Be capable to use the existing data acquisition module andcomputer programs to obtain and analyze the electric machinesoperation characteristics | (k) |
| 7.  | (e) |
| 8.  | (e) |
| 9. |  |
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