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

Course Syllabus

1. General Information:

Alpha-numeric codification: INEL 5408
Course Title: Electric Motors Control
Number of credits: 3
Contact Period: 3 hours of lecture per week
Elective in INEL

2. Course Description:

English: Electric motor drive systems, modeling of D.C and A.C machines, Characteristics and selection, analysis and design of converter fed open loop and closed loop D.C and A.C drive systems, design of controllers, braking methods

Spanish:

3. Pre/Co-requisites and other requirements:

INEL4405, INEL4416 and INEL4505

4. Course Objectives:

After completing the course, students will be able to understand the basic architecture and methodology for the design of open loop and closed loop electric drives. Students will also be able to select drives according to applications, taking into consideration mechanical load and operational characteristics needed.

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:

6. Minimum or Required Resources Available:

P-Spice, MATLAB, and demonstration of Practical Drive Systems in Laboratory

7. Course time frame and thematic outline

Outline	**Contact Hours**
Introduction to Electric Drive Systems	1
Mechanical system requirements	2
Review of power converters for drive systems	3
Modeling of D.C motors	2
Phase and chopper controlled D.C drives	6
Feedback controller design	3
Polyphase induction motors-Review of steady state analysis	2
Performance calculation of voltage and current sourse inverter fed induction motors, static rotor resistance control, slip power recovery control, closed loop control of induction motor drives	10
Polyphase synchronous motors-Review of steady state analysis	2
Open loop and closed loop synchronous motor drives	4
Introduction to reluctance and permanent magnet motor drives Three class tests	3 6
Total hours: (equivalent to contact period)	44

8. Grading System

☒Quantifiable (letters) ☐ Not Quantifiable

9. Evaluation Strategies (Suggested): The faculty member teaching the course will provide the student with the evaluation strategy he/she will be using throughout the semester. This will be done within the first week of classes.

	Quantity	Percent
☐ **Exams**	**3**	**60**
☐ **Final Exam**	**1**	**30**
☐ **Short Quizzes**		
☐ **Oral Reports**		
☐ **Monographies**		
☐ **Portfolio**		
☐ **Projects**	**1**	**10**
☐ **Journals**		
☐ **Other, specify:**		
TOTAL:		**100%**

10. Bibliography:

1. G.K. Dubey, 'Fundamentals of Electric Drives', CRC Press 2002
2. R.Krishnan, 'Electric motor drives- Modeling, Analysis and Control', Prentice Hall,2001

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.

12. Contribution of Course to meeting the requirements of Criterion 5:

Math	Basic Science	General	Engineering Topic
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13. Course Outcomes	**Map to Program Outcomes**
1. Mechanical system requirements for electric drives	(a)
2. Modeling of D.C Motors	(a)
3. Phase and chopper controlled D.C Drives	(a)
4. Design of feed back controllers for D.CDrives	(c)
5. Design of feedback controllers for D.C Drives	(k)
6. VSI and CSI fed induction motor drives-performance calculation	(a)
7. Closed loop control and static slip power recovery scheme for induction motors	(a)
8. Closed loop induction motor drives	(e)
9. Synchronous motor drives-Performance calculation	(a)
10. Closed loop control of a synchronous motor drive system	(e)

Person(s) who prepared this description and date of preparation: _____
Submitted by: Efrain O'Neill nov 2006