



Department of Electrical Engineering

College of Engineering

Salahaddin University – Erbil

Subject: Servo Systems

Course Book: Third Academic Year / Computer and Control Eng.

Lecturer : Assist Prof. Dr. Fadhil Toufick Aula

Academic Year: 2020 -2021 Spring Semester

Course Book

1. Course name	Servo Systems
2. Lecturer	Assist Prof. Dr. Fadhil Toufick Aula
3. Department/ College	Electrical / Engineering
4. Contact	e-mail: fadhil.aula@su.edu.krd
5. Time (hr. / week)	2 hrs/week
6. Office hours	4
<p>7. Course overview: Power electronics is an enabling technology, providing the needed interface between electrical sources and electrical loads Facilitating the transfer of the power from the source to the load by converting voltages and currents from one form to another Converters; discontinuous conduction mode and continuous conduction mode Inverters: Single phase voltage source bridge inverters and their steady state analysis Isolated switching mode power supply Introduction to Thyristors and its family, static and dynamic characteristics, turn-on and turn-off methods and firing circuits Introduction to servo systems: stepper motor, servo motor, actuators.</p>	
<p>8. Course Objective: After successfully completing this course, a student will have gained an understanding of:</p> <ol style="list-style-type: none"> 1. Understand the concept of DC converters 2. Be able to analyze the Discontinuous Conduction Mode and Continuous Conduction Mode 3. Determine their voltage conversion ratios in various DC converters 4. Be able to analyze AC voltage rectifier and understand the generation of harmonics. 5. Be able to analyze controllable Thyristor converter. 6. Understand single-phase, full-bridge inverters. 7. Understand power switches 8. Principle of stepper motor operation 9. Principle of servo motor operation. 	
<p>9. Student's Obligation</p> <ul style="list-style-type: none"> ➤ Regular attendance is required according to the university rules. ➤ The use of mobile phone during the class is prohibited. ➤ Only the students who are officially enrolled can attend the class, guests and children are not admitted. ➤ Daily participation and conducting assignments are required. 	

<p>10. Forms of Teaching Teaching methods include overhead project presentation, online materials, classroom website, in class whiteboard usage.</p>											
<p>11. Assessment Scheme</p> <table> <tr> <td>Midterm Exam</td> <td>20 %</td> </tr> <tr> <td>Daily + assignments + Quizzes, etc.</td> <td>20 %</td> </tr> <tr> <td>Annual</td> <td>40 %</td> </tr> <tr> <td>Final Exam</td> <td>60%</td> </tr> <tr> <td>Total</td> <td>100%</td> </tr> </table>		Midterm Exam	20 %	Daily + assignments + Quizzes, etc.	20 %	Annual	40 %	Final Exam	60%	Total	100%
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<p>12. Course Reading List:</p> <ol style="list-style-type: none"> 1. Ned Mohan, Power electronics : A first course, Wiley , 2012 2. A. Hughes and B. Drury, Electric Motors and Drives: Fundamentals, Types and Applications, Elsevier, 2019 											
<p>Spring Semester: 15 Weeks</p>											
Week	Subject										
1 st	Introduction										
2 nd	DC to DC Chopper										
3 rd	AC to DC Thyristor Converters										
4 th	DC to AC Inverters										
5 th	AC to AC Voltage Regulators										
6 th	Switched Mode Power Supplies										
7 th	Power Electronics Switches										
8 th	Midterm Exam										
9 th	Electrical DC Servo Motors										

10 th	Stepping Servo Motors
11 th	AC Servo Motors
14 th	Dead week
15 th	Final Exam