



The Hashemite University
Faculty of Engineering
Course Syllabus

Course Title: Electrical Machines and Drive Laboratory **Course Number:** 110405423
Department: Department of Mechatronics **Designation:** Compulsory
Prerequisite(s): 110405422
Instructor: Dr. Mohammad Salah **Instructor's Office:** E3130
Eng. Shatha Ahmad E2071

Instructor's e-mail: msalah@hu.edu.jo, www.msalah.com

Office Hours: Announced on the office door

Time: 1:00 – 4:00 (Mon + Tue) **Class Room:** E1043

Course description: This course introduces experiments on single and three-phase transformers, autotransformers, separately excited, shunt, series, and compound DC motors, three-phase induction motors, DC and AC generators, speed control and drive systems (convertors and invertors).

Textbook(s): Stephen Chapman: "Electric Machinery Fundamentals", 5th edition, McGraw Hill, 2012.

Other required material:

1. Smarajit Ghosh, "Electric Machines," Pearson Education: Delhi, 2005.
2. Sayed Naser, "Handbook of Electrical Machines," McGraw-Hill: New York, 1987.
3. Sayed Naser, "Electrical Machines and Electromechanics," Schaum's outline series , 2nd Ed, 1998.

Course objectives: *The student shall be able to:*

1. Evaluate and analyze the performance characteristics of transformers and electric motors (DC and AC)
2. Apply various methods of operation, control, and drive for DC and AC motors.

Topics covered:

1. Basic Measurements
2. Transformers
3. Shunt DC Motor
4. Series DC Motor
5. Three Phase Induction Motor
6. Operational Methods of Motors
7. Motor Drive Systems

Class/laboratory schedule: 1 lab session each week; 120-180 minutes

Grading Plan:

Assignments + Quizzes	(30 Points)	As scheduled
Midterm Exam	(30 Points)	Week of 18/4/2021 TBD
Final Exam	(40 Points)	Week of 30/5/2021 TBD

General Notes: Attendance is mandatory and absence is allowed up to ONE lab

Prepared by: Dr. Mohammad Salah **Date:** 21/2/2021

Laboratory Schedule

Week No.	Week of	Experiment	Activity
2	28/2/2021	EX 1 (Basic Measurements)	On campus Quiz 1 + Lab Work 1
3	7/3/2021	EX 2 (Transformers – Single Phase)	<ul style="list-style-type: none"> Group A for both sections on campus to do Quiz 2 + Lab Work 2 Group B for both sections on MS Teams with online assignment
4	14/3/2021	EX 2 (Transformers – Three-Phase)	<ul style="list-style-type: none"> Group A for both sections on MS Teams with online assignment Group B for both sections on campus to do Quiz 2 + Lab Work 2
5	21/3/2021	EX 3 (Shunt DC Motors)	<ul style="list-style-type: none"> Group A for both sections on campus to do Quiz 3 + Lab Work 3 Group B for both sections on MS Teams with online assignment
6	28/3/2021	EX 4 (Series DC Motors)	<ul style="list-style-type: none"> Group A for both sections on MS Teams with online assignment Group B for both sections on campus to do Quiz 3 + Lab Work 3
7	4/4/2021	EX 7 (Motor Drive Systems – DC Drives)	All groups in all sections on MS Teams with online assignment
8	11/4/2021	Midterm Exam (Practical)	On campus exam with all taken experiments
9	18/4/2021	EX 5 (Three-Phase Induction Motors)	<ul style="list-style-type: none"> Group A for both sections on campus to do Quiz 4 + Lab Work 4 Group B for both sections on MS Teams with online assignment
10	25/4/2021	EX 6 (Operational Methods of Motors)	<ul style="list-style-type: none"> Group A for both sections on MS Teams with online assignment Group B for both sections on campus to do Quiz 4 + Lab Work 4
11	2/5/2021	EX 7 (Motor Drive Systems – AC Drives)	All groups in all sections on MS Teams with online assignment
12	9/5/2021	Design Experiment	Group A for both sections on campus to do Lab Work 5
13	16/5/2021	Design Experiment	Group B for both sections on campus to do Lab Work 5
14	23/5/2021	Free Lab	
15	30/5/2021	Final Exam	On campus exam with all taken experiments

Note: How to troubleshoot three-phase induction motors are included in the final exam