

**The University of Jordan**  
**School of Engineering**  
**Mechatronics Engineering Department**  
1st Semester – A.Y. 2020/2021



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<b>Course:</b>	<b>Power Electronics &amp; Drive Lab – 0908423 (1 Cr. – Required Course)</b>
<b>Instructor:</b>	Eng. Nazmi Abu-Ashour Office: 4th floor, Mechatronics Engineering. Telephone: 5355000 ext 23025, Email: l.sharif@ju.edu.jo
<b>Course website:</b>	<a href="https://elearning.ju.edu.jo/course/view.php?id=15081">https://elearning.ju.edu.jo/course/view.php?id=15081</a>
<b>Catalog description:</b>	Introduction to the power electronic components (SCR, Diode, IGBT). Speed and torque control of a DC motor with a load. Inverter control of an induction motor. Modeling and simulation of electrical drives systems and electrical machines using Simulink with external mechanical loads.
<b>Prerequisites by course:</b>	<b>MXE0908321</b> Power Electronics and Drive (pre- or co-requisite)
<b>Prerequisites by topic:</b>	Students should have assumed to have sufficient knowledge in: Diodes, transistors, SCR, diacs, triacs, transformers.
<b>Textbook:</b>	<b>Experiment Sheets on the e-learning website</b> <a href="https://elearning.ju.edu.jo/course/view.php?id=15081">https://elearning.ju.edu.jo/course/view.php?id=15081</a>
<b>References:</b>	1. Power Electronics, Daniel W. Hart, McGraw Hill, International Edition, 2011.
<b>Schedule:</b>	16 Weeks, 6 Labs (3 hours each) plus exams.
<b>Course goals:</b>	This is a practical course of Electrical Machines that is provided by the Department of Electrical Engineering for the Electrical Engineering students. It is designed to achieve the following objectives: <ul style="list-style-type: none"><li>• Provide the student with the basic skills and proficiency of implementing the wiring diagrams required to conduct the testing procedures of transformers, AC and DC generators and motors.</li><li>• Provide the student with the basic skills of conducting different testing procedures of the different types of electrical machines.</li><li>• Allow the student to benefit from the testing results of the testing procedures to calculate the parameters of the tested machine equivalent circuit.</li><li>• Provide the student with the proficiency of constructing the experimental performance characteristics of the different types of machines and correlate practical and theoretical results.</li></ul>

**Course learning outcomes (CLO) and relation to ABET student outcomes (SO):**

- Upon successful completion of this course, a student should: **[SO]**
1. Proficiently deal with the measuring instruments usually involved in power electronic circuits such as voltmeters, ammeters, ohmmeters, wattmeters, power factor meters. **[1, 6]**
  2. Understand and construct the wiring diagram of the different testing procedures of power electronic circuits. **[5, 6]**
  3. Improve report writing skills **[3]**
  4. Construct and understand the different performance characteristics of power electronic circuits. **[5, 6]**
  5. Correlate practical and theoretical results of the power electronic circuits **[5, 6]**

**Course topics:**

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| 1. Single phase rectifiers (half wave and full wave rectifiers). | <b>3</b>   |
| 2. Three phase rectifiers  | <b>3</b>   |
| 3. AC Motor Control using a Thyristor                            | <b>3</b>   |
| 4. DC Motor control using an SCR                                 | <b>3</b>   |
| 5. Boost Converter   | <b>3</b>   |
| 6. Variable Frequency Drive inverters driving a SCIM             | <b>3</b>   |

**Ground rules:**

Attendance is required and highly encouraged. To that end, attendance will be taken every lecture. All exams (including the final exam) should be considered cumulative. Exams are closed book. No scratch paper is allowed. You will be held responsible for all reading material assigned, even if it is not explicitly covered in lecture notes.

**Assessment & grading policy:**

Assignments	0%	Quizzes	10%
First Exam	0%	Projects	0%
Midterm	30%	Reports	20%
Final Exam	40%	Presentation	0%
			<b>Total</b>
			<b>100%</b>

**Last Revised:** November 2, 2019