



Philadelphia University
Faculty of Engineering, Department of Mechatronics Engineering.
Course Syllabus

Course Title: Machine and power electronics Laboratory (0640415), 4th Year.

Prerequisite: 1- Power electronics and drives (640312).
 2- Electronics and Transducers Lab (640412).

Credit Hours: 1-credit hours (16 weeks per semester, approximately 45 contact hours).

Course description: Thyristor characteristics and operation; Single-phase and three-phase rectifiers; DC-AC inverter; D.C machines; AC machines; power drives; speed control.

Website: <http://www.philadelphia.edu.jo/academics/ssalah/>

Instructor: **Instructor:** Eng. Samer Zaid Sartawi.
Email: ssalah@philadelphia.edu.jo
Office: Engineering building, room 6411. ext: 2346

Laboratory Outlines:

Week	Exp.#	Experiment Name	
1	---		Introduction.
2	1	Power electronics	The Single phase, half and full wave uncontrolled Rectifier.
3	2		The Single phase, half and full wave controlled Rectifier.
4	3		Three Phase, full wave uncontrolled and controlled Rectifier.
5	4		Three Phase, full-thyristor rectifier for driving a DC motor.
6	5		The Single phase Converters (choppers and inverters).
7	6		Electrical machine
8	7	The characteristics of separately excited DC generator.	
9	8	Output characteristics and speed control of shunt DC motor.	
10	9	Output characteristics and speed control of series DC motor.	
11	10	Three Phase Induction motor.	
12	11	Drive	Four Quadrant speed torque diagram of DC motor.
13	12		Open loop & Closed loop PID speed control of shunt DC motor.
14	---		Final Exam.

Course Learning Outcomes with reference to ABET Student Outcomes:

Upon successful completion of this Laboratory, student should:

1.	Design and analysis of single & three phase rectifiers (controlled & uncontrolled).	[1,6]
3.	Design and analysis of single phase inverters.	[1,6]
4.	Understand and analysis the DC machine characteristics.	[1,6]
5.	Understand and analysis the AC induction machine characteristics.	[1,6]
6.	Use power electronics to drive and control the electrical machine.	[6]

Assessment Guidance:

Evaluation of the student performance during the semester (total final mark) will be conducted according to the following activities:

Reports: The students should deliver full printed report after finishing the experiment within one week; the delivering is due at the beginning of the class. Late two days report will be graded from half of the total mark. Other late reports(over 2 days) will not be accepted.

Quizzes: 3-quizzes of 10-minutes will be conducted during the semester. The materials of the quizzes are set by the lecturer.

Final Exam: The students will undergo a scheduled final exam at the end of the semester covering the whole materials taught in the course.

Grading policy:

Reports	30%
Quizzes	30%
Final Exam	40%
Total:	100%

Final Exam Category	Mark
Theoretical part	10
Practical part	30
Total	40

Report (Marks distribution):

This table must be printed in the cover page.

The report mark will be converted from 20 to 15 mathematically.

Report part	Ideal mark	Your mark
Cover page	0.25	
Objective	0.25	
Theory	0.25	
Apparatus	0.25	
Data	6	
Analysis	7	
Discussion	3	
Conclusion	3	
Total	20	

References Books:

1. Electrical Machinery Fundamentals, S.J. Chapman, Mc-Graw-Hill, 2012.
2. Electrical Machines and Transformers, principles and applications, P. F. Ryff, D. Platnick & J. A. Karnas, Prentice-Hall 1987.
3. Electrical Machinery, A. E Fitzgerald, C. Kingsley, sixth edition, Mc-Graw-Hill, 2003.
4. Power Electronics, Circuits, Devices, and applications. M. H. Rashid, Prentice Hall, 3rd Edition, 2004.
5. Power Electronics, By: Mohan, John Wiley.
6. Power Electronics, By: B.K.Bose, Prentice Hall.

References websites:

- <http://www.delorenzogloball.com/en/index.php>