



Jordan University of Science and Technology
Faculty of Engineering
Electrical Engineering Department

EE536 Power Electronics Lab - JNQF Level: 7

First Semester 2023-2024

Course Catalog

1 Credit Hours. Single-phase fully-controlled bridge rectifier with static/rotating loads. Single-phase half-controlled bridge rectifier. Three-phase controlled bridge rectifier. Single-phase ac voltage controller. Frequency converter. Single-phase bridge inverter with static/rotating loads. Three-phase bridge inverter. Step-down converter. Step-up converter. Step down/up converter. Lab project.

Text Book

Title	Laboratory Manual
Author(s)	De Lorenzo
Edition	14th Edition
Short Name	Textbook
Other Information	

Course References

Short name	Book name	Author(s)	Edition	Other Information
Ref # 1	Power Electronics	D. Hart	1st Edition	
Ref # 2	Power Electronics: Circuits, Devices, and Applications	M. H. Rashid	4th Edition	
Ref # 3	Power Electronics	C. Lander	3rd Edition	

Instructor

Name	Prof. Moh"D Rashad Al-Mothafar
Office Location	E2L3
Office Hours	Sun : 13:30 - 14:30 Mon : 10:15 - 11:30 Tue : 13:30 - 14:30 Wed : 10:15 - 11:30 Wed : 13:00 - 14:30

Email	mothafar@just.edu.jo
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Class Schedule & Room
Section 1: Lecture Time: Mon : 14:30 - 17:30 Room: LAB Section 2: Lecture Time: Wed : 14:30 - 17:30 Room: LAB

Tentative List of Topics Covered		
Weeks	Topic	References
Week 1	Introduction to the lab facilities and how to use various measuring instruments.Experiment 1; Single-phase uncontrolled rectifier with R/L load, will be used as a demo	
Week 2	Experiment 2:(a) Single-pulse controlled rectifier with R/L load; (b) Single-pulse controlled rectifier with free-wheeling diode and R/L load	
Week 3	Experiment 3:(a) Two-pulse mid-point fully-controlled rectifier with R/L load; (b) Half-controlled rectifiers with R/L load	
Week 4	Experiment 4: Three-phase six-pulse fully-controlled bridge rectifier with R/L load	
Week 5	Experiment 5: Step-down dc-dc converter	
Week 7	Experiment 6: Step-up dc-dc converter	
Week 8	Experiment 7: (a) Single-phase-controlled rectifier in the inversion mode; (b) DC motor drive	
Week 9	Experiment 8: Single-phase switched-mode inverter	
Week 10	Experiment 9: Single-phase AC voltage controller	
Week 11	Experiment 10: Flyback dc-dc converter	
Week 12	Experiment 11: Study of the generation of electric energy from photovoltaic panels and its inlet in the mains network.	

Mapping of Course Outcomes to Program Outcomes and NQF Outcomes	Course Outcome Weight (Out of 100%)	Assessment method
Conduct experiments to determine the characteristic data of single-phase and three-phase controlled rectifier circuits. [1SO6] [1L7S1]	25%	

Conduct experiments to determine the characteristic data of buck, boost and flyback DC-DC converters. [1SO6] [1L7S1]	25%	
Conduct experiments to determine the characteristic data of single-phase sinusoidal PWM inverters. [1SO6] [1L7S1]	20%	
Conduct experiments to determine the characteristic data of single-phase AC voltage controllers. [1SO6] [1L7S1]	10%	
Conduct experiments to determine the characteristic data of loaded solar cells under different levels of illumination. [1SO6] [1L7S1]	10%	
Work effectively in a team under peer guidance and take responsibility for group work. [1SO5] [1L7C3]	10%	

Relationship to Program Student Outcomes (Out of 100%)						
SO1	SO2	SO3	SO4	SO5	SO6	SO7
				10	90	

Relationship to NQF Outcomes (Out of 100%)	
L7S1	L7C3
90	10

Evaluation	
Assessment Tool	Weight
Lab Reports	20%
Simulation Assignments	10%
Mid-term Exam	30%
Final Exam	40%

Policy	
Mid-term Exam	Theoretical and Experimental
Lab Reports	Pre and Post-lab Reports
Simulation Assignments	Simulation of Power Electronics Circuits
Final Exam	Theoretical and Experimental

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