



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

EE736 Switched Mode Converters - JNQF Level: 9

First Semester 2024-2025

Course Catalog

3 Credit Hours. An introduction to switched-mode dc-dc converters circuits, analysis, and design. The first part covers steady-state analysis and design: converter modeling and analysis, switch realization, and transformer-isolated converters. The second part covers converter dynamics and control: AC modeling and controller design using classical loop shaping techniques.

Teaching Method: On Campus

Text Book

Title	Fundamentals of Power Electronics
Author(s)	R. Erickson and D. Maksimovi?c,
Edition	3rd Edition
Short Name	Textbook
Other Information	

Course References

Short name	Book name	Author(s)	Edition	Other Information
r1	Power Electronics: Converters, Applications, and Design	N. Mohan, T. Undeland, and W. Robbins,	3rd Edition	
r2	Elements of Power Electronics	P. Krein	2nd Edition	
r3	Switching Power Supplies A to Z	Sanjaya Maniktala	1st Edition	

Instructor

Name	Dr. Ahmad Bashaireh
Office Location	-

Office Hours	Mon : 08:00 - 09:00 Tue : 11:30 - 13:30 Wed : 10:00 - 13:00 Thu : 08:00 - 09:00
Email	aabashaireh@just.edu.jo

Class Schedule & Room
Section 1: Lecture Time: Tue : 08:30 - 11:30 Room: LAB

Tentative List of Topics Covered		
Weeks	Topic	References
Week 1	Introduction to power electronics converters	Ch1 From Textbook
Week 2	Principles of steady-state converter analysis	Ch2 From Textbook
Week 3	Steady-state equivalent circuit modeling, losses, and efficiency	Ch3 From Textbook
Week 4	Switch realization	Ch4 From Textbook
Week 5	The discontinuous conduction mode	Ch5 From Textbook
Weeks 6, 7	Converter circuits	Ch6 From Textbook
Weeks 8, 9	AC Equivalent Circuit Modeling	Ch7 From Textbook
Week 10	Converter transfer functions	Ch8 From Textbook
Weeks 11, 12	Controller designn	Ch9 From Textbook
Week 13	Current Programmed Control	Ch18 From Textbook
Weeks 14, 15, 16	Selected Topics	

Mapping of Course Outcomes to Program Outcomes and NQF Outcomes	Course Outcome Weight (Out of 100%)	Assessment method
Analyze switched-mode converters during steady-state in continuous and discontinuous conduction mode [1L9K2]	20%	
Recognize the different types of power electronics switches and their characteristics [1L9K1]	10%	
Derive the averaged equivalent circuit model of a switched mode converter [1L9S1]	15%	
Understand transformer isolation in a dc-dc converters [1L9K1]	20%	
Derive the small signal AC model of a switched-mode converters and related transfer functions [1L9C1]	15%	

Design a feedback controller using classical loop shaping techniques. [1L9S2]	20%	
--	-----	--

Relationship to Program Student Outcomes (Out of 100%)						
--	--	--	--	--	--	--

SO1	SO2	SO3	SO4	SO5	SO6	SO7

Relationship to NQF Outcomes (Out of 100%)				
--	--	--	--	--

L9K1	L9K2	L9S1	L9S2	L9C1
30	20	15	20	15

Evaluation	
------------	--

Assessment Tool	Weight
Homework	20%
Project	20%
Midterm	25%
Final	35%

Date Printed: 2024-10-26