



MUTAH UNIVERSITY
Faculty of Engineering
Department of Electrical Engineering



Course Syllabus
Study Plan 2021: Power and Control Track

Course Code	Course Name	Credits	Contact Hours
0401464	Power Electronics	3	3 T

INSTRUCTOR/COORDINATOR

Name	Prof. Hussein Al-Majali
Email/Office	halmajali@mutah.edu.jo / Eng. Bldg.-Prof. Hussein Al-Majali Office
Office Hours	10:00-11:00 (Sun, Tues)
Classroom/Time	Hall 1 / 08:00 – 09:30 (Mon, Wend.)

TEXTBOOK

Title	<i>Power Electronics: Converters, Applications, and Design</i>
Author/Year/Edition	N. Mohan, T. M. Undeland, and W. P. Robbins, 3rd ed. Hoboken, NJ: John Wiley & Sons, 2003/2007

Other Supplemental Materials

Title	Power Electronics
Author/Year/Edition	C. W. Lander, 3 rd ed. McGraw-Hill

SPECIFIC COURSE INFORMATION

A. Brief Description of the Content of the Course (Catalog Description)

This course is an introductory course in power electronics. It provides the students with the basic knowledge of power semiconductor devices (diodes, Thyristors, IGBTs, MOSFETs...etc); their classifications and operational characteristics. This course also covers the analysis, principles of operation, design and control of power electronic converters (Rectifiers, Choppers, Inverters, and Cycloconverters); and their associated industrial applications such as: power supply, DC and AC motor drives, renewable energy systems, FACTS, HVDC,...etc

B. Pre-requisites (P) or Co-requisites (C)

Electronic Circuits and Devices (0401230) (P)
Electric Machines (1) (0401372) (P)

C. Course Type (Required or Elective)

Required

SPECIFIC GOALS

A. Course Learning Outcomes (CLOs)

By the end of this course, the student should be able to:

CLO1: Understand the components of power electronics and learn their key characteristics [1].

CLO2: Understand the basic operation, losses and efficiency of the power electronics converters [1].

CLO3: Use various methods to analyse power electronics circuits [2].

CLO4: Understand the application requirements of converters in given applications [2].

B. Student Learning Outcomes (SOs) Addressed by the Course

1	2	3	4	5	6	7
✓	✓					

BRIEF LIST OF TOPICS TO BE COVERED

List of Topics	No. of Weeks	Contact Hours
Chapter 1: Introduction and Overview of Power Semiconductor/Electronics Devices	1	3
Chapter 2: Power Converter (<i>Rectifiers</i>) AC-to-DC Converters	3	9
Chapter 3: Power Converter (<i>Choppers</i>) DC-to-DC Converters	2	6
Chapter 4: Power Converter(<i>Inverters</i>) DC-to-AC Converters	2	6
Chapter 5: Multi-Inverter	2	6
Chapter 6: Power Converter (<i>Cycloconverters</i>) AC-to-AC Converters	1	3
Chapter 7: Power System Harmonics	1	3
Chapter 8: Protection of Power Electronics Switches	1	3
Chapter 9: Applications of Power Electronics Converters	1	3
Tutorial classes if needed.		
Total	14	42

EVALUATION

Assessment Tool	Due Date	Weight (%)
Mid Exam	According to the university calendar	30

Course Work (Homeworks, Quizzes, Projects, ...etc.)	One week after being assigned	20
Final Exam	According to the university calendar	50

ABET's Students Learning Outcomes (Criterion # 3)		
Relationship to program outcomes		
ABET 1-7		Engineering Student Outcomes
1	√	an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2	√	an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
3		an ability to communicate effectively with a range of audiences.
4		an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
5		an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
6		an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
7		an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.