



**The Hashemite University**  
**College of Engineering**  
**Department of Electrical Engineering**  
**EE 560-Power Electronics (3 Credit Hours/Dept. Elective)**

**Instructor**

Dr. Mohammad Widyan	
Email:	mohammadwidyan@yahoo.com
Office:	Eng. 3063
Office hours:	Sun/Tues/Thurs: 09:00-11:00 Mon/Wed: 11:00-12:30

**Grading info**

Test 1	30%
Test 2	30%
Final	40%

**Class Info**

Days	Sun/Tues/Thurs
Time	12:00-13:00
Location	Eng. 2011

**Course**

Course Number:	409560
Prerequisite:	Electronics II (409341), covering the following topics: - Physical construction, principle of operational, characteristics and applications of several semiconductor devices like diodes, BJT, MOSFET.
Textbook:	<b>"Power Electronics, Circuits, Devices and Application"</b> by Mohan, Undeland and Robbins, John Wiley, 3 <sup>rd</sup> edition, 2003.
Course Description:	This course provides the students with foundation for the knowledge of the power semiconductor devices, their characteristics and operation. It also gives a deep understanding of power electronic circuits such as rectifiers and inverters. Their analysis and some design aspects are also investigated. Protection circuits for the devices and circuits are also investigated.
Specific Outcomes of Instruction (Course Learning Outcomes):	<ol style="list-style-type: none"> <li>1. Demonstrate the operation of power semiconductor devices (a, e)</li> <li>2. Review basic electrical circuit concepts (a, e)</li> <li>3. Demonstrate knowledge of computer usage in calculations of line current distortion and symbolic integration (a, e, k)</li> <li>4. Analyze the performance of controlled and uncontrolled single and three-phase rectifier circuits (a, e)</li> <li>5. Demonstrate and analyze the DC-DC switch mode converters (a, e)</li> <li>6. Demonstrate and analyze the DC-AC switch mode inverters (a, e)</li> </ol>
Important material	<ul style="list-style-type: none"> <li>- Lecture notes</li> <li>- References</li> <li>- Internet resources</li> </ul>

**References:**

"Power Electronics: Circuits, Devices & Applications", Author: Muhammad H, Rashid, 4 <sup>th</sup> Edition.
---

**Major Topics Covered and Schedule in Weeks:**

Topic	# Weeks	# Contact hours*
Power electronic systems	1	3
Power semiconductor switches	1	3
Review of electrical circuits	1	3
Review of Fourier series and line current distortion	1	3
Uncontrolled rectifiers	3	9
Controlled rectifiers	3	9
DC-DC converter	3	9
DC-AC Inverters	2	6
<b>Total</b>	<b>15</b>	<b>45</b>

**Course Policy**

<ul style="list-style-type: none"> <li>- If you miss class, there won't be a makeup test, quiz, etc. and you WILL get a zero unless you have a valid excuse.</li> <li>- Cheating and plagiarism are completely prohibited.</li> <li>- If you miss more than 15% of classes you will automatically fail the class.</li> </ul>
--

**Student Outcomes (SO) Addressed by the Course:**

#	<i>Outcome Description</i>	<i>Contribution</i>
<b><i>General Engineering Student Outcomes</i></b>		
(a)	An ability to apply knowledge of mathematics, science, and engineering	<b><i>H</i></b>
(b)	An ability to design and conduct experiments, as well as to analyze and interpret data	
(c)	An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	
(d)	An ability to function on multidisciplinary teams	
(e)	An ability to identify, formulate, and solve engineering problems	<b><i>H</i></b>
(f)	An understanding of professional and ethical responsibility	
(g)	An ability to communicate effectively	
(h)	The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	
(i)	a recognition of the need for, and an ability to engage in life-long learning	
(j)	A knowledge of contemporary issues	
(k)	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice	<b><i>L</i></b>

**H=High, M= Medium, L=Low**