

## EE—547: Advanced Power Electronics

<b>Lecture Schedule</b>		Tuesday and Thursday 16:30 – 18:00	<b>Course Type, Semester</b>	Core for Power , Electronics & Communication Spring—2020		
<b>Credit Hours</b>		Three	<b>Pre-requisites</b>	Undergraduate course in Power Electronics		
<b>Instructor</b>		Umar T. Shami	<b>Contact</b>	utshami@uet.edu.pk		
<b>Office</b>		FYP Lab, Ground Floor, E. E. Depart., U.E.T.				
<b>Course Description</b>		The course will cover the subject of advanced power electronics in detail; including important topics as generic power converter, comparison of semiconductor power switches, supplementary components and systems, phase-controlled rectifiers, voltage-source inverters, matrix converters, multilevel inverters, soft-switching inverters, isolated and non-isolated switched-mode DC-to-DC converters, power electronics applications to energy conservation.				
<b>Measurable Learning Outcomes</b>	<b>CLOs</b>	<b>Description</b>	<b>Taxonomy Level</b>	<b>PLOs</b>	<b>Level</b>	
	CLO1	Apply the concept of solid state electronics to realize semiconductor general properties and supplementary components for power electronics.	C-2	PLO1	High	
	CLO2	Analyze the basic operation of PWM and Phase-controlled Rectifiers.	C-3	PLO2	High	
	CLO3	Investigate DC to AC Voltage-Source Inverters including analysis.	C-4	PLO4	High	
	CLO4	Evaluate DC to DC converters and renewable energy applications	C-5	PLO7	High	
<b>Textbooks</b>		<b>REQUIRED:</b> Introduction to Modern Power Electronics By Andrzej M. Trzynadlowski, Wiley (2016). <b>OPTIONAL:</b> Optimal design of switching power supply By Zhanyou Sha, Xiaojun Wang, Yanpeng Wang, and Hongtao Ma, Wiley, 2015.				

**Lecture Plan EE—547: Advanced Power Electronics**  
**Dr Umar T. Shami**

**Revised Course Outline Plan Due to Online-Cum Distance Learning (ODL) Classes**

<b>Week</b>	<b>Topics</b>	<b>Recommended Readings &amp; CLOs</b>
<b>1.</b>	<b>AC-to-AC Converters</b> PWM AC Voltage Controllers, Cycloconverters, Matrix Converters, Device Selection For AC-to-AC Converters, Common Applications Of AC-to-AC Converters.	A.M. Trzynadlowski Chap-6 CLO-3
<b>2.</b>	<b>DC-to-DC Converters</b> Static Dc Switches, Step-Down Choppers, Step-Up Chopper	A.M. Trzynadlowski Chap-6 CLO-4
<b>3.</b>	<b>DC-to-DC Converters</b> Current Control In Choppers, Device Selection For Choppers, Common Applications Of Choppers	A.M. Trzynadlowski Chap-6 CLO-4
<b>4.</b>	<b>DC-to-AC Converters</b> Voltage-Source Inverters, Current-Source Inverters, Multilevel Inverters	A.M. Trzynadlowski Chap-7 CLO-3
<b>5.</b>	<b>DC-to-AC Converters</b> Soft-Switching Inverters, Device Selection For Inverters, Common Applications Of Inverters	A.M. Trzynadlowski Chap-7 CLO-3
<b>6.</b>	<b>Switching Power Supplies</b> Basic Types Of Switching Power Supplies, Non-isolated Switched-Mode DC-to-DC Converters, Isolated Switched-Mode Dc-To-Dc Converters	A.M. Trzynadlowski Chap-8 CLO-4
<b>7.</b>	<b>Power Electronics and Clean Energy</b> Why Is Power Electronics Indispensable In Clean Energy Systems, Solar And Wind Renewable Energy Systems, Fuel Cell Energy Systems, Electric And Hybrid Cars, Power Electronics and Energy Conservation.	A.M. Trzynadlowski Chap-9 CLO-4