

School of Management, Engineering and Technology  
Department of Electrical Engineering and Renewable Energy  
EE 321: Electronics I – Introduction to Amplifiers and Semiconductor Devices

Catalogue Description (2009/2010):	Top-down approach. Voltage, current, transresistance and transconductance amplifiers. Operational amplifiers. Two-port models. Transfer functions, frequency response, gainbandwidth-product. Nonlinear distortion, slewrate. Introduction to semiconductors, holes and electrons, p-n junctions, FETs, I vs V curves. FET amplifiers. Student must register for a laboratory section.		
Hours/Credits: (Lecture-Lab-Total)	(4-3-4)		
Class Schedule:	Twice-weekly 100 minute lectures, one term		
Lab Schedule:	Once weekly three hour labs, one term		
Prerequisites:	EE 223 with grade "C" or better		
Required Text:	Hambley, A.R., "Electronics," 2nd Ed., Prentice Hall, ISBN: 0-13-691982-0		
Reference Text:	none		
Course Coordinator:	Robert Bass, Ph.D.		
Regular Instructors:	Robert Bass, Mateo Aboy, Cristina Crespo, Bruce Barnes, Paul Dingman		
Course Objectives:	<p>Upon completion of the course, a student should be able to:</p> <ul style="list-style-type: none"> <li>• Have a good understanding of general amplifier concepts.</li> <li>• Be able to perform ideal op-amp analysis and design.</li> <li>• Have a good understanding of op-amp DC effects and limitations.</li> <li>• Have a good understanding of op-amp AC effects and limitations.</li> <li>• Be capable of analyzing and designing linear op-amp circuits and active filters.</li> <li>• Be capable of analyzing and designing diode circuits.</li> <li>• Be capable of analyzing and designing basic MOSFET &amp; BJT circuits.</li> <li>• Show knowledge and understanding of basic semiconductor device physics.</li> </ul>		
Topics Covered:	<ul style="list-style-type: none"> <li>• General Amplifier Concepts and the Design Processes for Electronics</li> <li>• Operational Amplifiers</li> <li>• Physics of the PN Junction, Diode Characteristics and Circuits</li> <li>• Physics of FET Transistors , MOSFET Amplifiers</li> <li>• Physics of BJT Transistors , BJT Amplifiers</li> </ul>		
Relevant Program Outcomes:	<p>(a) an ability to apply knowledge of mathematics, science, and engineering            (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 multi-disciplinary teams            (e) an ability to identify, formulate, and solve engineering problems            (g) an ability to communicate effectively            (i) a recognition of the need for, and an ability to engage in life-long learning            (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice</p>		
Required or Elective:	Required		
Criterion 5:	Engineering Topics		
Prepared By:	Robert Bass, Ph.D.	Updated:	April 26, 2010