WASHINGTON STATE UNIVERSITY
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School of Engineering and Computer Science

MECH 431: Semiconductor Devices

Catalog Data:		**431 Semiconductor Devices** 3 Course Prerequisite: CHEM 105; PHYSICS 202. Crystal properties, energy bands, semiconductor charge carriers, p-n junctions, field-effect transistors, bipolar junction transistors, optoelectronic devices, integrated circuits. Typically offered Spring.
Class Schedule:		Three 50-min lecture sessions per week, for one semester
Laboratory Schedule:		None
Prerequisites by Course:		CHEM 105; PHYSICS 202
Prerequisites by Topic:		1. Crystal structures and bonds 2. Motion of particles 3. Electricity, DC and AC circuits 4. Differential equations
Textbook:		Robert F. Pierret, *Semiconductor Device Fundamentals*, 1st Edition, Addison-Wesley, 1996
Course Coordinator:		Dr. Jong-Hoon Kim
Course Objectives:		1. Understand the crystal structures and semiconductor growth. 2. Learn the physical models of atoms and electrons. 3. Obtain fundamental knowledge and concepts of semiconductors. 4. Learn how materials influence the device performance. 5. Understand the construction and final structures of semiconductor electronic devices. 6. Be familiar with different types of semiconductor electronic devices and their operation principles. 7. Describe the practical applications and recent trends in semiconductor device design. 8. Obtain fundamental knowledge of integrated circuits.
Topics Covered:		1. Crystal properties and growth of semiconductors 2. Atomic structures 3. Bonding forces and energy bands in solids 4. Charge carriers in semiconductors 5. Carrier transport phenomena 6. p-n junctions 7. Metal-oxide-semiconductor field-effect transistors 8. Bipolar junction transistors 9. Optoelectronic devices 10. Integrated circuits
Lab Experiments and Activities:		None
Course Outcomes:	Students will be able to:	
	Assessed for Student Outcomes	1-a. Demonstrate knowledge of semiconductor materials and devices. 1-d. Apply scientific principles and mathematics to estimate the properties of semiconductor devices (physics and engineering disciplines). 4-a. Evaluate semiconductor devices in consideration of economic, societal, and environment factors.

	Other			
Required or Elective Course:		Elective		
Relationship of Course to Program:		Meets: Educational Objectives 1, 3 Student Outcomes 1, 4		
Prepared by:		Dr. Jong-Hoon Kim	Date:	March 22, 2018 (4/9/18 mb)
Approved by USC:		4/2/2018		