WASHINGTON STATE UNIVERSITY
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School of Engineering and Computer Science

ECE 302: Properties of Electronic Materials
Master Syllabus

Catalog Data:	**ECE 302: Properties of Electronic Materials**; 3 credits Schrodinger's wave equation, potential barrier problems, crystal structure and bonds, band theory of solids, semiconductors, super conductor, dielectric and magnetic material properties. Typically offered in Spring.
Class Schedule:	Three lecture hours per week, for one semester.
Laboratory Schedule:	None.
Prerequisites by Course:	CHEM 105 Principles of Chemistry, and PHYS 202 Physics for Scientists and Engineers II.
Prerequisites by Topic:	Atoms and Elements, Atomic Structure, Bonding and Molecular Structure, Fundamentals of Quantum Physics, and Wave Motion.
Typical Text:	*Principles of Electronic Materials and Devices*, S.O.Kasap, 3rd Edition, McGraw-Hill, 2006. (Required) *Electronic Materials and Devices*, D. K. Ferry and J. P. Bird, Academic Press, 2001. (Recommended)
Course Coordinator:	Dr. Feng Zhao
Course Objectives:	Students will: 1. The students will learn the physical principles of electronically and ionically conducting materials, dielectrics, optical and magnetic materials. 2. Students will apply the basic principles of quantum mechanics to electronic materials. 3. Students develop knowledge of the microscopic properties of electronic materials.
Topics Covered:	1. Crystal structures and bonding 2. Electrical and thermal conductivity 3. Introduction to quantum mechanics 4. Band gaps and structure 5. Intrinsic and extrinsic semiconductors, p-n junction 6. Dielectric and piezoelectric properties 7. Magnetic and optical properties
Lab Experiments and Activities:	None
Course Outcomes:	Students will be able to:

	Assessed for Student Outcomes	1-a. Demonstrate knowledge of the working principle of electronic devices. 1-d. Apply fundamental electrical, optical, dielectric and magnetic principles to understand electronic material properties. 7-c. Apply new knowledge in solving crystallographic directions and planes, the linear and planar atomic densities in a particular crystal structure.		
	Other	1-b. Evaluate information to identify the structures and properties of metals, insulators and semiconductors. 7-a. Use resources not taught in class to independently assess electronic material properties and applications.		
Relationship of Course to Program:		Meets Educational Objectives: 1, 4 Student Outcomes: 1, 7		
Prepared by:		Dr. Feng Zhao	Date:	March 14, 2018; 3/21/18 (mb) Feb 27, 2012 Reviewed:05/29/12