WASHINGTON STATE UNIVERSITY
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School of Engineering and Computer Science

ECE 316: Nanotechnology for Semiconductor and Renewable Energy Applications
Master Syllabus

Catalog Data:	**316: Nanotechnology for Semiconductor and Renewable Energy Applications.** 3 credits. Scaling laws, nanofabrication, nanomaterials, nanoscale characterization; nanotechnology in semiconductor industry, critical dimension, solar cells, fuel cells, energy storage, batteries, energy efficiency and energy savings. Typically offered in Spring.
Class Schedule:	Two 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:	Understand atomic structure, material properties, and applications.
Typical Text:	*Nanotechnology: A Gentle Introduction to the Next Big Idea*, Mark Ratner and Daniel Ratner, Prentice Hall, 2003. Handouts provided by the instructor. *Energy Efficiency and Renewable Energy Through Nanotechnology*, Ling Zhang (Ed.), Springer, 2011.
Course Coordinator:	Dr. Praveen Sekhar
Course Objectives:	Students will: 1. Understand the fundamental concepts of nanotechnology and their relevance to the semiconductor and renewable energy technology. 2. Be familiar with scaling laws and processes that are used in nanofabrication. 3. Recognize the applications of nanotechnology and its societal implications. 4. Identify local career opportunities in semiconductor and energy areas.
Topics Covered:	1. Introduction 2. Nanoscale phenomena 3. Nanofabrication 4. Nanoscale characterization 5. Nanotechnology application in semiconductor fabrication 6. Role of nanotechnology in renewable energy and energy efficiency applications 7. Current research trends and career opportunities 8. Guest lectures by pioneers in industry
Lab Experiments and Activities:	None (The class will be shown how nanowires are grown along with scanning electron micrographs of their dimensions)

Course Outcomes:	Students will be able to:			
	Assessed for Student Outcomes	1-a. Demonstrate a working knowledge of nanotechnology principles and its commercial applications. 2-c. Analyze a nanoengineered system subjected to environmental and economic constraints. 7-b. Search, read and learn current nanotechnology based literature for up to date information on the state-of-the-art technology.		
	Other	2-d. Apply concepts in nanotechnology to solve problems in semiconductor and renewable industry. 4-a. Evaluate nanotechnology based solution to problems considering economic, environmental and societal impacts.		
Relationship of Course to Program:		Meets: Educational Objectives: 1, 2, 3, 4 Student Outcomes: 1, 2, 4, 7		
Prepared by:		Dr. Praveen Sekhar	Date:	March 9, 2018; 3/21/18 (mb) Feb 27, 2012