WASHINGTON STATE UNIVERSITY
VANCOUVER
World Class. Face to Face.

School of Engineering and Computer Science

ECE 496: Silicon Integrated Circuit Fabrication Technology
Master Syllabus

Catalog Data:	**ECE 496: Silicon Integrated Circuit Fabrication Technology;** 3 credits (2-3) Hands-on experience in design, fabrication, characterization and testing of monolithic silicon devices and integrated circuits; completion of a design project. Typically offered in Spring.
Class Schedule:	Two lecture hours per week, for one semester
Laboratory Schedule:	One 3-hour lab session per week, for one semester
Prerequisites by Course:	ECE 349
Prerequisites by Topic:	1. Crystal structures 2. Energy band 3. Carrier diffusion and drift 4. Homo and heterojunctions 5. Principles of p-n diode, BJT, MOSFET, metal-semiconductor contact
Typical Text:	Stanley Wolf, Richard N Tauber, *Silicon Processing for the VLSI Era, Vol. 1: Process Technology*, Second Edition, Lattice Press, 1999, ISBN: 978-0961672164 Richard C. Jaeger, *Introduction to Microelectronic Fabrication: Volume 5 of Modular Series on Solid State Devices*, Second Edition, Prentice Hall, 2001, ISBN: 978-0201444940
Course Coordinator:	Dr. Feng Zhao
Course Objectives:	This course provides undergraduate students the unique opportunity to gain hands-on experience in design, fabrication, characterization and testing of silicon integrated circuits. The course teaches students the basic microfabrication and characterization techniques. These techniques are then used to fabricate and test a variety of electronic devices and circuits. Students will: 1. Obtain knowledge in operation safety and protocol of clean room and microfabrication facility. 2. Be able to design and layout silicon integrated circuits, and their process flow. 3. Understand all basic silicon fabrication techniques and related theory. 4. Gain hands-on experience in circuit fabrication process and characterization. 5. Understand the challenges and interactions between critical process steps. 6. Learn operating fundamentals of data analysis techniques and tools.
Topics Covered:	1. Introduction to microelectronic fabrication 2. Circuit design 3. Mask layout 4. Dopant diffusion 5. Ion implantation

Lab Experiments and Activities:		Topics covered will be converted into laboratory sessions as needed for demonstrations and hands-on activities to design, fabricate, and test resistors, MOS capacitors, diodes, transistors, and integrated circuits.		
Course Outcomes:	Students will be able to:			
	Assessed for Student Outcomes	2-c. Analyze microfabrication processes considering environmental factors. 3-a. Produce lab reports using appropriate format and grammar. 4-a. Evaluate global and environmental impacts the fabrication technologies may cause.		
	Other Outcomes	3-b. Deliver well-organized, logical oral presentations, including good explanations when questioned. 6-a. Identify constraints in micro/nano fabrication technologies.		
Relationship of Course to Program:		Meets: Educational Objectives 1, 2, 3, 4 Student Outcomes 2, 3, 4, 6		
Prepared by:		Dr. Feng Zhao	Date:	March 15, 2018; 3/21/18 (mb)