



**University of Tehran**  
**School of Electrical and Computer Engineering**

<b>Course:</b>	<b>8101212 - Theory and Technology of Device Fabrication</b>									
<b>Course type:</b>	EE*						CE*			Credit: 3
	Com	E	P	B	Con	D	SW	HW	IT	
	Required	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Elective	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>Level:</b>	Undergraduate <input type="checkbox"/> Graduate <input checked="" type="checkbox"/>									
<b>Co-requisite(s):</b>	None.									
<b>Prerequisite(s):</b>	Physics of Electronics (8101277)									
<b>Prerequisite by topic:</b>	Physics of semiconductor devices									
<b>Textbook(s):</b>	[1] Silicon VLSI Technology. Fundamentals, Models and Computer Simulations. Plummer, Deal, Griffin Prentice Hall (2000) [2] Instructor's notes [3] Semiconductor Material and Device Characterization. Second edition Dieter. K. Schroder, John Wiley sons Inc (1998)									
<b>Coordinator:</b>	Dr. Mohammadreza Kolahdouz, Assistant Professor, School of ECE Dr. Morteza Fathipour, Associate Professor, School of ECE									
<b>Goals:</b>	Basic knowledge of semiconductor device physics and capability of designing and fabricating complex process flow for integrating electronic circuits									
<b>Outcome:</b>	Upon successful completion of the course, students will be able to: 1. combine fabrication methods to develop complex process flows for functional devices and circuits in a range of applications (e.g. transistors, solar cells, optoelectronics...) 2. apply the knowledge to specific device requirements through careful selection among a number of choices 3. compare alternative fabrication methods 4. describe the technological processes involved in the fabrication of nano- and microelectronic devices and circuits									
<b>Topics:</b>	1. Introduction to Microelectronic fabrication 2. MOSFET fabrication technology in a glance 3. Wafer fabrication and Epitaxy 4. Cleanrooms, Wafer cleaning and Gettering 5. Photolithography 6. Thermal Oxidation 7. Annealing process									

	8. Diffusion 9. Ion Implantation 10. Chemical vapor deposition
<b>Computer usage:</b>	-
<b>Assignments:</b>	6 homework assignments
<b>Projects:</b>	-
<b>Grading:</b>	Assignments: 10% Presentation: 10 % Quizzes: 10 % Midterm exams: 30% Final exam: 40 %
<b>Further readings:</b>	VLSI Technology, SZE
<b>Prepared by:</b>	Dr. Mohammadreza Kolahdouz
<b>Date:</b>	September 2017

*EE: Electrical Engineering		CE: Computer Engineering	
Com	Communications	SW	Software
E	Electronics	HW	Hardware
P	Power	IT	Information Technology
B	Bioelectronics		
Con	Control		
D	Digital System		