University of Tehran
School of Electrical and Computer Engineering

Course:	**8101087 - Electronics 1**
Course type:	<table><tr><td></td><td colspan="6">EE*</td><td colspan="3">CE*</td><td rowspan="2">Credit: 3</td></tr><tr><td></td><td>Com</td><td>E</td><td>P</td><td>B</td><td>Con</td><td>D</td><td>SW</td><td>HW</td><td>IT</td></tr><tr><td>Required</td><td>☐</td><td>☒</td><td>☐</td><td>☐</td><td>☐</td><td>☒</td><td>☐</td><td>☐</td><td>☐</td></tr><tr><td>Elective</td><td>☐</td><td>☐</td><td>☐</td><td>☐</td><td>☐</td><td>☐</td><td>☐</td><td>☐</td><td>☐</td></tr></table>
Level:	Undergraduate ■ Graduate ☐
Co-requisite(s):	None.
Prerequisite(s):	Electronic circuits 1 (8101359)
Prerequisite by topic:	KVL and KCL, Thevenin and Norton equivalent circuits, impedance, frequency response
Textbook(s):	[1] Behzad Razavi, Fundamentals of microelectronic, 2006. [2] Instructor's notes [3] S. Mireshghi, Fundamentals electronic, second edition.
Coordinator:	Dr. Mohammadreza Kolahdouz, Assistant Professor, School of ECE Dr. Zeinab Sanaii, Assistant Professor, School of ECE
Goals:	Basic knowledge of semiconductor device physics and capability of analyzing circuits containing diodes and BJTs.
Outcome:	Upon successful completion of the course, students will be able to: 1. analyze circuits containing a few diodes or transistors 2. design a bias circuit for BJTs 3. estimate small-signal response of a circuit made of diodes and BJTs
Topics:	1. Introduction to semiconductor physics 2. PN junction and diode circuits 3. Diode applications - Rectifiers - Limiters and clampers - regulators 4. Bipolar junction transistors • Background physics • IV characteristics and different working modes • Circuits 5. DC bias circuit of a BJT • Biasing of a BJT • Graphical solution (load line) • Stability factors 6. Bipolar amplifiers

	• Small-signal circuit • Main mono-stage amplifiers • Multi-stage amlifiers Physics of MOS Transistors
Computer usage:	H-spice for simulation of projects
Assignments:	7 to 9 homework assignments
Projects:	2 projects, one before midterm and one before final
Grading:	Assignments: 10% Projects: 10 % Quizzes: 10 % Midterm exams: 30% Final exam: 40 %
Further readings:	Microelectronic Circuits, Sedra/Smith 2003
Prepared by:	Dr. Mohammadreza Kolahdouz
Date:	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		