University of Tehran
School of Electrical and Computer Engineering

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<tr><td>Course:</td><td colspan="10">8101088 – Electronics 2</td></tr>
<tr><td>Course type:</td><td colspan="10"><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><td></td></tr>
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<tr><td>Level:</td><td colspan="10">Undergraduate ■
Graduate ☐</td></tr>
<tr><td>Co-requisite(s):</td><td colspan="10">None.</td></tr>
<tr><td>Prerequisite(s):</td><td colspan="10">Electronic Circuits (8101554), Electronics 1 (8101087)</td></tr>
<tr><td>Prerequisite by topic:</td><td colspan="10">Diode and single stage bipolar junction transistor circuits</td></tr>
<tr><td>Textbook(s):</td><td colspan="10">[1] Adel Sedra and Ken Smith, Microelectronics Circuits. Oxford 5th edition, 2004.</td></tr>
<tr><td>Coordinator:</td><td colspan="10">Shahin Jafarabadi Ashtiani, Professor, School of ECE</td></tr>
<tr><td>Goals:</td><td colspan="10">The course provides electrical engineering students with the required concepts for electronic circuits. Students will learn about field effect transistor circuits. They learn to analyze and design both DC biasing of the circuits as well as the different amplifier configuration. In addition, they learn differential amplifier circuits, current source circuits, class A, class B, and class AB output stages. Four different feedback topologies are thought. Finally, the student should become familiar with some applications of Op-Amps along with non-ideal</td></tr>
<tr><td>Outcome:</td><td colspan="10">Upon successful completion of the course, students will be able
1. to design and analysis current mirror circuits,
2. to use feedback techniques to solve the amplifier circuits with feedbacks,
3. to design and analysis single and multi-stage FET amplifiers, differential amplifiers, output stages, Op-Amp circuits,
4. to calculate input and output resistances, current and voltage gains, of BJT and FET transistor amplifiers.</td></tr>
<tr><td>Topics:</td><td colspan="10">1) Introduction: Basic Amplifier Configurations/Diode
2) BJT: Basic/Bias
3) BJT: ac
4) FET: Basic/Bias
5) FET: Bias-ac
6) Frequency Response of Basic Amplifiers
7) Differential Amplifiers
8) Current Mirrors</td></tr>
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	9) Output Stages: Class A and Class B 10) Output Stages: Class AB 11) Feedback: Basic/Series-Shunt 12) Feedback: Shunt-Series/Series-Shunt/Series-Series 13) Op-Amp: Basic/Applications/Non-idealities
Computer usage:	SPICE
Assignments:	10 to 12 homework assignments
Projects:	Circuit analysis and design by circuit simulations.
Grading:	Assignments: 10 % Projects: 5 % Quizs: 10 % Midterm exams: 35% Final exam: 40 %
Further readings:	[1] Behzad Razavi, *Fundamentals of Microelectronics*, John Wiley, 2007. [2] B. Razavi, *Design of Analog CMOS Integrated Circuits*, McGraw-Hill, 2001.
Prepared by:	Ali Afzali-Kusha
Date:	Updated: 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		