



EHB 262E: Electronics II

Instructor: Asst. Prof. Dr. Mustafa Berke Yelten

Email: yeltenm@itu.edu

Office: EEF 2317

Teaching Assistant: TBD

Recommended texts:

- 1) A.S. Sedra, K.C. Smith, "Microelectronic Circuits", 7th edition, Oxford University Press, 2015.
- 2) B. Razavi, "Microelectronics", 2nd edition, Wiley, 2015
- 3) Mehmet Sait Türköz, "Çözümlü Elektronik Devreler", Birsen Yayınevi, 2006.

Course description: Amplification and the gain concept, voltage amplifier / current amplifier / transconductance circuit / transresistance circuit models, conceptual function of the transistor in amplification. DC analysis of transistorized (BJT, MOSFET) circuits. Small signal equivalents and terminal resistances of BJT and MOSFET. AC analysis of BJT and MOSFET amplifiers: Gain and input/output resistance of basic amplifier stages, analysis of cascade (direct/capacitively-coupled) amplifiers. Cascode structure, Darlington structure. Differential amplifier, differential and common-mode gains, common mode rejection ratio. Current sources, active-loaded circuits. Operational amplifier (Op-Amp), ideal and practical behavior, internal structure of a sample Op-Amp. Linear and non-linear applications of the Op-Amp, effect of non-idealities on the behavior. Power amplifiers.

Grading: %10 Quizzes, 20% Midterm I, 20% Midterm II, 30% Final exam, 20% HW (Total of 5 sets)
VF Limit → MT1 + MT2 > 50 (over 200)

Topics:

02/09:	Fundamentals of Transistor-Based Amplification	
02/16:	Physics of BJTs and MOSFETs	HW1
02/23:	Biasing of BJT Amplifiers	HW1 return
03/01:	Small Signal Analysis of BJT Amplifiers	HW2
03/08:	Biasing of MOSFET Amplifiers	HW2 return
03/15:	Midterm I	
03/22:	Small Signal Analysis of MOSFET Amplifiers	HW3
03/29:	Differential Amplifiers	HW3 return
04/05:	Current sources, current mirrors, active loaded circuits	HW4
04/12:	Multi-stage Amplifiers	HW4 return
04/19:	Midterm II	
04/26:	Linear and Nonlinear Applications of an Op-Amp	
05/03:	Internal Structure of an Op-Amp	HW5
05/10:	Output Stages and Power Amplifiers	HW5 return