



# ELE 501E: Noise in Electronic Devices and Systems

**Instructor:** Asst. Prof. Dr. Mustafa Berke Yelten  
**Email:** yeltenm@itu.edu  
**Office:** EEF 2317

**Recommended text:** Stephen A. Maas, “Noise in Linear and Nonlinear Circuits”, Artech House, Norwood, Massachusetts, USA, 2005

**Course description:** In this course, you will learn about noise in semiconductor devices and circuits. Noise is an inherent concept in electronic system design. It acts as a performance limiter and should be accounted for to meet the specifications. To better understand noise, first random processes will be reviewed. Then, fundamentals of noise analysis will be provided followed by the noise models of different transistor types. Noise analysis of circuits is explained. This will lead to the design of low noise amplifiers (LNAs) and noise optimization/cancellation techniques employed in LNAs. After discussing the noise response of main RF building blocks, last weeks will be reserved for presentations prepared by students based on their term paper topics.

**Grading:** 25% Midterm, 40% Final exam, 25% Term paper & presentation, 10% HW

## Topics:

<b>09/17:</b>	Fundamentals of Noise Analysis and Random Processes	
<b>09/24:</b>	Festival of Sacrifice – No class	
<b>10/01:</b>	Noise Colors and Physical Sources of Noise	
<b>10/08:</b>	Noise Measurement Techniques	
<b>10/15:</b>	Noise Models of Semiconductor Devices	HW1
<b>10/22:</b>	Noise Theory of Linear and Nonlinear Circuits	HW1 return
<b>10/29:</b>	Republic Day – No class	
<b>11/05:</b>	Midterm	
<b>11/12:</b>	Amplifier Noise Calculations	HW2
<b>11/19:</b>	Low Noise Amplifiers & Noise Optimization Cancellation Techniques	HW2 return
<b>11/26:</b>	Noise of Mixers and Frequency Multipliers	Term Paper assigned
<b>12/03:</b>	Noise of Oscillators and Phase Locked Loops (PLLs)	
<b>12/10:</b>	Student term paper presentations	
<b>12/17:</b>	Student term paper presentations	
<b>12/24:</b>	No class	