ECE 3323: Principles of Communication Systems

Credit / Contact hours: 3 / 3

Course coordinator: Hamed Mohsenian-Rad

Textbook(s) and/or other required material: Lathi, B.P. and Ding, Zhi, Modern Digital and Analog Communication Systems, Oxford University Press, Fourth Edition, 2009.

Catalog description: Random processes and spectral densities. Fourier Transforms and linear systems concepts. Amplitude, phase angle, and pulse modulation communication systems. Pre-requisites: ECE 3303, MATH 3342 or IE 3341

Designation: Required.

Course learning outcomes: Upon completion of this course, students should be able to do the following:
1. Analyze and design amplitude modulation systems at the sub-system level.
2. Analyze and design angle modulation systems at the sub-system level.
3. Analyze and design pulse modulation systems at the sub-system level.
4. Apply basic methods of probability and random variables to signal-to-noise ratios.

Student outcomes addressed: a, e, and k.

Topics covered:
Introduction to electrical communication systems - 1 hour
Signals, vectors, and Fourier series - 3 hours
Fourier transform of signals in linear systems - 4 hours
Power spectral density and autocorrelation function - 2 hours
Amplitude modulation systems: AM, DSB-SC, SSB, VSB - 6 hours
Angle modulation systems: FM and PM - 6 hours
Heterodyne receivers - 1 hour
Pulse code modulation systems - 6 hours
Random processes and noise - 3 hours Signal-to-noise ratios - 4 hours
Principles of digital data transmission - 3 hours
Tests and reviews - 3 hours