

EE 505 B Fall 2013

Syllabus

- The class web page is at <https://canvas.uw.edu/courses/847773>. You will need to log in with your UW netID.
- Announcements will be posted to the “Announcements” section of the class web page. Please ensure that you regularly (e.g., daily) check for new announcements. The “Discussion” section exists for you to ask questions to the your class members, the TAs, and me.
- The TAs for the class are
 - [David Caballero](#)
 - [Tamas Gal](#)
- Classes will be held in EEB 125 on Tuesday evenings from 6:00–9:50 pm.
- I post assignments typically on the day of, or the day after the class. Assignments will be due at the start of each class every week.
- There will be a midterm and a final exam. The midterm will be held during class time. The final exam will only include the material that was not tested in midterm exam.
- Grading: the assignments will be worth 30 % of your final grade, and the exams 35 % each.
- I will hold review sessions on the weekend. You are not required to attend these sessions, but many students find them to be very useful. The TAs will also hold a review session during the week.
- The textbook is “Probability and Random Processes with Applications to Signal Processing and Communications” by Scott Miller and Donald Childers.

- Outline of the material covered in the class. Section numbers below refer to sections in the textbook. For material that the textbook does not cover, I provide class notes and links to online reference material.
 - *Review of linear algebra* (Appendix B, class notes, online references): Matrix operation, matrix column space, orthogonal vectors, basis, eigenvalues and eigenvectors, diagonalizing a matrix, complex matrices, discrete Fourier transform matrix.
 - *Review of signals and systems* (Appendix C, class notes, online references): Linear systems, shift invariance, convolution, matrix formulation of convolution, eigenvectors of an LTI system, transforms.
 - *Review of vector calculus* (class notes, online references): Double integrals, triple integrals, cylindrical and spherical coordinates, vectors, vector algebra (dot product, determinant, cross product), vector fields, gradient of a scalar field, parametric curves, line integrals of a scalar field, line integrals of a vector field, curl, Stokes's Theorem, parametric surfaces, surface integrals, Divergence, Divergence Theorem.
 - *Review of probability theory*: Review of set theory (Appendix A), random experiments (2.1), sample spaces (2.1), events (2.1), axioms of probability (2.2), principle of total probability (2.5), assigning probability (2.3), statistical independence (2.6), conditional probability (2.4), Bayes' Rule (2.5).
 - *Random variables*: Introduction to random variables (2.7), probability mass function (2.7), discrete random variables (2.7), continuous random variables, cumulative distribution function (3.1), probability density function (3.2), uniform random variable (3.4), exponential random variable (3.4), Transformations of discrete random variables, transformations of continuous random variables (4.6), conditional distribution and density functions (3.5), detection theory, expectation (4.1), expectation of functions of random variable (4.2), properties of the expectation operator, conditional expectation (4.5), moments (4.3), central moments (4.4), information (4.12) and Huffman coding.
 - *Multiple random variables*: Two or more random variables (5), joint and marginal probability mass functions (5.3), conditional probability mass functions (5.4), joint and marginal cumulative distribution functions (5.1), joint and marginal probability density functions (5.2), independent random variables (5.6), expectation and correlation (5.5), random vectors (6.1, 6.2, 6.3).
 - *Random processes*: Random processes (8.1), first and second moments (8.2), wide sense stationary (8.3), power spectral density (10.1), response to linear systems (11.1).