

EE 5352_{.001,.002,.003} STATISTICAL SIGNAL PROCESSING

Professor: M.T. Manry
Time: 12:30-1:50 PM T-Th

Reference Text: "Fundamentals of Statistical Signal Processing: Estimation Theory"
by S. M. Kay

In this course, students will gain basic statistical signal processing skills required for **DSP-related jobs** in fields such as **data science, bioengineering, remote sensing, telecom**, feature extraction for **pattern recognition** and forecasting weather and power usage.

After reviewing signal processing topics such as convolution and z-transforms, we will cover relevant topics in **random processes** such as autocorrelation functions, power spectrum estimation and the approximation of probability density functions using **Gaussian mixture models**. In the second part of the course optimal filters and AR models will be covered. **Adaptive noise cancellation** using steepest descent will be studied.

In the third part of the course, maximum likelihood (**ML**) and maximum a posteriori (**MAP**) methods for deriving parameter estimation algorithms will be presented. Data compression techniques, including **principal components**, will be studied as methods for pre-processing signals for **near-optimal parameter estimation**.

There will be at least five program assignments in order to enhance industry-required programming skills, including assignments on the Toeplitz recursion and nonlinear minimum mean-squared error estimation. **Prerequisites:** (1) EE5350(DSP) **or equivalent**, (2) An undergraduate knowledge of probability and random processes.

Contact Prof. Manry if you have any registration problems. Non-EE students are welcome. *A few \$500 Scholarships are available for students taking this course.*

