**Midterm 1 Study Topics – ChE 310 Spring 2019**

* MATLAB basics
	+ Use of basic built-in functions (e.g. sin, exp, round, abs)
	+ M-files: scripts vs. functions, concept of scope
	+ Anonymous functions/function handles
	+ Accessing and assigning array variables
	+ Colon notation, linspace/logspace functions
	+ Boolean expressions: relational and logical operators
	+ If… ElseIf… Else structures
	+ For loops
	+ While loops, error estimation, and stopping criteria
	+ Nesting of loops
	+ Data import/export (to screen as well as to file)
	+ Plotting: plot/semilog/loglog functions, fplot function, subplots
* Statistics and measurement
	+ Accuracy and precision
	+ Types and sources of error
	+ True error, relative error, defining error tolerance
	+ Built-in MATLAB statistical functions
		- mean, median, mode, std, iqr
		- Plotting: box, histogram
	+ Probability density functions, cumulative density functions, MATLAB tools for fitting distributions and generating data according to those distributions
* Interpolation
	+ *Order* of polynomials and relationship to size of data set
	+ Newton/LaGrange methods for creating interpolating polynomials
	+ MATLAB polynomial syntax
	+ Built-in functions for finding and using interpolating polynomials: polyfit, polyval
	+ Multi-dimensional interpolation
	+ Piecewise interpolation and built-in functions (interp1, interp2)
	+ Splines: common types, implementation in MATLAB
* Differentiation
	+ Forward, backward, central difference formulas
	+ $O(h^{n})$ truncation error notation
	+ Differentiation of discrete data sets
	+ Differentiation of functions
	+ Differentiation strategies for unevenly spaced data