ESC103F Engineering Mathematics and Computation: Course Syllabus, Fall 2020

Unit 1: Introduction to Vectors

Unit 2: Dot Product

Unit 3: Projections

Unit 4: Cross Product

Unit 5: Lines and Planes in 3-D

Unit 6: Solving Linear Equations

Unit 7: Introduction to Matrices

Unit 8: Seeing Matrices as Transformations

Unit 9: Composition of Two Linear Transformations – Why We Multiply Matrices the Way We Do

Unit 10: Eigenvalues, Inverses and Determinants

Unit 11: Solving Systems of Linear Equations

Unit 12: Reduced Normal Form (or, if you prefer, Reduced Row Echelon Form)

Unit 13: Rank – The True Size of a Matrix

Unit 14: Matrix Inverses

Unit 15: Finding the Inverse Using Gaussian Elimination

Unit 16: Numerical Integration – Working with Rectangles and Trapezoids

Unit 17: Simpson's Rule – A Nice Application of Curve Fitting

Unit 18: Numerical Solutions to First Order Differential Equations

Unit 19: Higher Order Systems

Unit 20: Boundary Value Problems

Unit 21: Solving the Least Squares Problem

Unit 22: A Second Look at Gaussian Elimination

Unit 23: A Third (and Final) Look at Gaussian Elimination

Unit 24: An Important Theorem and a Good Segue into MAT185