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Website: [https://faculty.washington.edu/kutz/am301/am301.html](https://faculty.washington.edu/kutz/am301/am301.html)

**Schedule**

Lecture 1 (9/29): Vectors and matrices (Sec. 1.1)
Lecture 2 (10/1): Programming logic: IF and FOR (Sec. 1.2)
Lecture 3 (10/4): Linear spaces and operators: (notes sent separately)
Lecture 4 (10/6): $\mathbf{A}\mathbf{x} = \mathbf{b}$: Gaussian elimination (Sec. 2.1)
Lecture 5 (10/8): $\mathbf{A}\mathbf{x} = \mathbf{b}$: LU decomposition (Sec. 2.1)
Lecture 6 (10/11): $\mathbf{A}\mathbf{x} = \mathbf{b}$: Iterative solutions (Sec. 2.2)
Lecture 7 (10/13): Eigenvalues and eigenvectors (Sec. 2.3)
Lecture 8 (10/15): Eigen-decompositions and iterations (Sec. 2.1-2.3)
Lecture 9 (10/18): Singular value decomposition (Part 3: Sec. 15.1)
Lecture 10 (10/20): Principal component analysis: Applications in modeling (Part 3: Sec. 15.3)
Lecture 11 (10/22): Principal component analysis: Face recognition (Part 3: Sec. 15.1-15.3)
Lecture 12 (10/25): Numerical differentiation (Sec. 4.1)
Lecture 13 (10/27): Numerical integration (Sec. 4.2)
Lecture 14 (10/29): EXAM #1
Lecture 15 (11/1): Differential equations & time-steppers (Sec. 5.1)
Lecture 16 (11/3): Error and stability of numerical schemes (Sec. 5.2)
Lecture 17 (11/5): General time-stepping schemes (Sec. 5.1-5.2)
Lecture 18 (11/8): Fourier transforms (Sec. 6.1)
Lecture 19 (11/10): The FFT, DCT and DST (Sec. 6.2)
Lecture 20 (11/12): Image compression (Part 3: Sec. 14.1)
Lecture 21 (11/15): Curve fitting and least-squares (Sec. 3.1)
Lecture 22 (11/17): Polynomial fitting and splines (Sec. 3.2-3.3)
Lecture 23 (11/19): EXAM #2
Lecture 24 (11/22): Nonlinear curve fitting (Brunton & Kutz, Sec. 4.1)
Lecture 25 (11/24): Gradient descent optimization (Brunton & Kutz, Sec. 4.2)
Lecture 26 (11/29): Neural networks and simple classification (Brunton & Kutz, Sec. 6.1-6.2)
Lecture 27 (12/1): Backpropagation algorithm (Brunton & Kutz, Sec. 6.3)
Lecture 28 (12/3): Stochastic gradient descent (Brunton & Kutz, Sec. 6.4)
Lecture 29 (12/6): Deep convolutional networks (Brunton & Kutz, Sec. 6.5)
Lecture 30 (12/8): Neural networks for dynamics (Brunton & Kutz, Sec. 6.6)
Lecture 31 (12/10): EXAM #3