Thu	Jan 23	**Lecture 1**	What? Why? Example. Slope field. Analytical approach.	
Fri	Jan 24	Lab 1	Python and UBx	
Tue	Jan 28	**Lecture 2**	Solutions by guessing. Separable DE. Exponential growth and decay.	
Wed	Jan 29	Homework 1 due	Intro to Ubx and Jupyter.	
Thu	Jan 30	**Lecture 3**	Linear DE. Mixing problem. Matching DE with slopefield.	
Fri	Jan 31	Lab 2	Plotting slope fields and using them to solve IVPs	
Tue	Feb 4	**Lecture 4**	Existence and uniqueness. Numerical solution: Euler's method.	
Wed	Feb 5			
Thu	Feb 6	**Lecture 5**	Euler's method, cont'd. Qualitative approach: logistic example. Phase line.	
Fri	Feb 7	Lab 3	Euler's method to solve an IVP (step halving for accuracy assessment)	
Tue	Feb 11	**Lecture 6**	Ch 2. Higher Order DE. 2nd order linear homogeneous DE, E/U, general solution.	
Wed	Feb 12			
Thu	Feb 13	**Lecture 7**	Second solution by reduction of order. Constant coefficients: 3 cases.	
Fri	Feb 14	Lab 4	Phase line: a model of a harvested fish population	
Tue	Feb 18	**Lecture 8**	2.4 Mechanical vibrations: frying pan, pendulum.	
Wed	Feb 19			
Thu	Feb 20	**Lecture 9**	Damped unforced oscillator. Non-homogeneous eqn: particular and general solution.	
Fri	Feb 21	Lab 5	The most comfortable shock	
Tue	Feb 25	**Lecture 10**	2.6 Forced oscillation and resonance.	
Wed	Feb 26			
Thu	Feb 27	**Lecture 11**	Ch 3. Systems of DE. Example: rabbits and foxes. Simpler example: guess/verify solution.	
Fri	Feb 28	Lab 6	The phase plane	
Tue	Mar 4	**EXAM 1**	Coverage Chapters 0,1,2 (excluding skipped sections).	
Wed	Mar 5			
Thu	Mar 6	**Lecture 13**	3.1.4 Automous 1st order systems, vector field, Euler's method. Linear constant coefficient. Matrix-vector multiplication, linear algebraic systems.	
Fri	Mar 7			
Tue	Mar 11	**Lecture 14**	Some special matrices. Determinant. General solution of linear 1st order system.	
Wed	Mar 12			
Thu	Mar 13	**Lecture 15**	Eigenvectors and eigenvalues. Nodal sinks and sources.	
Fri	Mar 14		**FIRST PROJECT DUE**	
Tue	Mar 18		SPRING RECESS	
Wed	Mar 19			
Thu	Mar 20			
Fri	Mar 21			
Tue	Mar 25	**Lecture 16**	Saddles. Spiral sinks and sources. Boundary cases: centers Jacob and Emily; double eigenvalue.	
Wed	Mar 26			
Thu	Mar 27	**Lecture 17**	Ch 8: Nonlinear 1st order systems, nullclines, phase portrait. Competing species example.	
Fri	Mar 28	Lab	The TD diagram	
Tue	Apr 1	**Lecture 18**	Recap TD diagram. Linearization at equilibria. Application to competing species.	
Wed	Apr 2			
Thu	Apr 3	**Lecture 19**	More examples of linearization: conclusive and inconclusive. Power series solution: 2 big ideas.	
Fri	Apr 4	Lab	Phase plane: skyscraper dynamics	
Tue	Apr 8	**Lecture 20**	Taylor polynomials: convergence, radius of convergence.	
Wed	Apr 9			
Thu	Apr 10	**EXAM 2**	Coverage Chapters 3, 8.	
Fri	Apr 11	Lab	Euler's method for systems (crucial for 2nd Project)	
Tue	Apr 15	**Lecture 22**	Series solution of Airy's equation. DE with a singular point.	
Wed	Apr 16			
Thu	Apr 17	**Lecture 23**	Further examples of series solution at singular point. Bessel's equation.	
Fri	Apr 18	Lab	Taylor series of a given function and of solution of given DE	
Tue	Apr 22	**Lecture 24**	Ch 6. Laplace transform: 8 examples.	
Wed	Apr 23			
Thu	Apr 24	**Lecture 25**	Laplace transform to solve DE IVP.	
Fri	Apr 25	Lab	Representing functions with jumps using Heaviside function	
Tue	Apr 29	**Lecture 26**	2 more Laplace transform rules. Example applications.	
Wed	Apr 30			
Thu	May 1	**Lecture 27**	[space for schedule slippage]	
Fri	May 2		**SECOND PROJECT DUE**	
Tue	May 6	**Lecture 28**	Review	
Wed	May 7			
Thu	May 8	FINAL EXAM	Comprehensive.	