This section is something of a Fast-and-Dirty Introduction to Differential Equations.			
We look briefly at Ordinary Differential Equations (ODEs)			
and even more briefly at Partial Differential Equations (PDEs)			
Week	**Date**	**Material**	**Reference**
1	25-Feb-13	**1. Ordinary Differential Equations.** What is an ODE?	**K** 2.2
		Linear and Non-linear ODEs. Where do they come from?	
		Guessing an exponential solution to a homogeneous linear ODE.	
2	4-Mar-13	Damped Simple Harmonic Motion (SHM). Spring-mass. Circuit.	**K** 2.2, **K** 2.4
		Guessing solutions with exponentials. Complex exponentials.	
		Over-damped, Under-damped and Critically damped situations	
4	18-Mar-13	Inhomogeneous ODEs.	**K** 2.7, **K** 2.8
		Solution is complementary function + particular integral	
		Guessing particular integrals in simple cases. Forced SHM.	
5	25-Mar-13	**2. Laplace Transform.** Definition.	**K** 6.1, **K** 6.2
		LT of some simple functions.	
		LT of derivatives.	
		(EASTER BREAK)	
6	8-Apr-13	Solving ODEs using Laplace Transforms.	**K** 6.2
		Solving an ODE. Partial fractions.	
		General method for applying LTs to linear ODEs	
7	15-Apr-13	The first shifting theorem for LTs - exponentials in the solution.	**K** 6.3
		The Heaviside unit step function. Switching functions.	
		The second shifting theorem. ODEs with switching forcing functions.	
8	22-Apr-13	**3. Partial Differential Equations.**	**K** 12.5
		Three types of second-order PDE; parabolic, elliptic, hyperbolic.	
		Solving the Heat Equation - parabolic PDE. Separation of variables.	
9	29-Apr-13	Elliptic PDEs.	**K** 12.5
		Laplace's equation for potential.	
		Solving Laplace's equation by separation of variables.	
10	6-May-13	Hyperbolic PDEs.	**K** 12.3
		Wave equations.	
		Solving the wave equation by separation of variables.	

K = Kreyszig 9th edition (2006)