



## Eduqas Physics – Component 2

### Module 4: Capacitance

This unit introduces the concept of capacitance and the factors affecting it. Capacitors connected in series and parallel are studied together with the factors affecting the energy stored in them. The mechanism by which a capacitor charges and discharges through a resistor is examined.

You should be able to demonstrate and show your understanding of:	Progress and understanding:			
	1	2	3	4
The idea that a simple parallel plate capacitor consists of a pair of equal parallel metal plates separated by a vacuum or air				
A capacitor storing energy by transferring charge from one plate to the other, so that the plates carry equal but opposite charges (the net charge being zero)				
The definition of capacitance as $C = \frac{Q}{V}$				
The use of $C = \frac{\epsilon_0 A}{d}$ for a parallel plate capacitor, with no dielectric				
The idea that a dielectric increases the capacitance of a vacuum-spaced capacitor				
The $E$ field within a parallel plate capacitor being uniform and the use of the equation $E = \frac{V}{d}$				
The equation $U = \frac{1}{2}QV$ for the energy stored in a capacitor				
The equations for capacitors in series and in parallel				
The process by which a capacitor charges and discharges through a resistor				
The equations: $Q = Q_0 \left(1 - e^{-\frac{t}{RC}}\right)$ and $Q = Q_0 e^{-\frac{t}{RC}}$ where $RC$ is the time constant				
<b>SPECIFIED PRACTICAL WORK</b>				
Investigation of the charging and discharging of a capacitor to determine the time constant				
Investigation of the energy stored in a capacitor				

