PHYS1022 Summary Sheet 7

Electromagnetic Induction
Chapter 27

27.1 Induced currents
In stationary loops

27.2 Faraday's Law
Magnetic flux
Different ways of changing the flux through a circuit:
Magnitude of B
Area
Angle between B and circuit

e.g. flux through a solenoid $\Phi_m = NB_n A$

Flux and induced emf

27.3 Induction and Energy
Lenz's law
Direction of induced emf (not JUST a minus sign!)
Moving coil

Motional emf
emf induced by motion of a conductor in a magnetic field
Various examples

27.4 Inductors in circuits

27.5 Magnetic Energy in an inductor
Magnetic energy density

27.6 Induced electric fields - another way of stating Faraday's law

$$\varepsilon = -\frac{d}{dt}\int_S \underline{B}\cdot d\underline{A} = -\frac{d\Phi_m}{dt} = \oint_C \underline{E}\cdot \underline{dl}$$

A changing magnetic field creates an electric field

Conservative and non-conservative electric fields