**PI:** Ali Bazzi – University of Connecticut

**Electrical Engineering Science Education Title:** Introduction to Designing a Power Inductor

WIP

**Essential Equations for a Core of Area (*A*c), Length (*l*), Permeability (*µr*), and *N* turns:**

* Reluctance (*R*)=*l/*(*μrμoAc*)
* Inductance (*L*)=*N2/R*
* Flux (*φ*)= *μrμoAcNi/l*
* Flux density (*B*)= *φ/Ac*
* *µo*=4π×10−7 [V](http://en.wikipedia.org/wiki/Volt)·[s](http://en.wikipedia.org/wiki/Second)/([A](http://en.wikipedia.org/wiki/Ampere)·m)
* Permeability of air is approximately *µo*.

**Ampere’s Law:**

where *H* is the magnetic field intensity, *C* is a closed contour, and *A* is a surface area.

**Faraday’s Law:**

**Gauss’s Law for Magnetism:**