Department	Electrical and Computer Engineering
Course Number	**EELE 355**
Course Title	Energy Conversion Devices
Total Credit Hours and Format	4 Credits. (3 Lec, 1 Lab) S
Catalog Description	PREREQUISITE: EELE 203 Three-phase power; electromechanical energy conversion devices and motor drives; introduction of power electronic converters for power control and motor drive applications. Laboratory experience includes power measurements; experience with transformers and motor-generator operational characteristics and DC and AC motor drives operation.
Faculty Coordinator	Hashem Nehrir
Course Designation	Required
Textbook	Theodore Wildi, Electrical Machines, Drives, and Power Systems, Sixth Edition, Pearson, Prentice Hall, 2006.
Course Learning Outcomes	At the conclusion of EE 355, students are expected to: 1) Understand the concept of real and reactive (complex) power. 2) Understand reactive compensation and design power factor correction circuits. 3) Analyze three-phase circuits. 4) Understand the concept of complex power in three-phase circuits. 5) Know principle of operation and characteristics of common energy conversion devices such as transformers, DC motors, three-phase and single-phase induction motors, and application of such devices in industrial settings. 6) Conduct experiments to obtain the characteristics of energy conversion devices. 7) Be familiar with the application of power electronics for variable-speed operation of electric motor drives. 8) Know the constant-flux (variable-frequency, variable-voltage) operation of induction motor drives. 9) Understand the operation of induction machines as induction generators in wind generation systems.
Program Outcomes	a, b, e, g, k
Topics Covered	1) Importance of Energy, sources of energy, Difference between power and energy, household energy use. 2) US power grid, power system layout, and power quality. 3) Single-phase and three-phase power, complex power, and factor improvement. 4) Principles of operation and equivalent circuit of energy conversion devices, transformers, three-phase and single-phase induction machines, stepper motors, DC machines. 5) Rotating fields in three-phase induction machines 6) Three-phase induction generators in wind generation systems 7) Application of power electronics in control of motor drives and power systems.
Prepared by	Hashem Nehrir (05/01/2015)