**PHYS 2008 Green Energy Laboratory I (1,1,0)**
Co-requisite: PHYS 2005 Heat and Motion or consent of instructor
By way of lectures and a series of experiments related to principles and application of energy science, this practical course introduces Year 2 students to the basic concepts and methodologies behind experimentation and energy science.

**PHYS 2009 Green Energy Laboratory II (1,1,0)**
Prerequisite: PHYS 2005 Heat and Motion or consent of instructor
Co-requisite: PHYS 2006 Electricity and Magnetism or consent of instructor
By way of a series of Green Energy experiments, this practical course introduces Year II students to the basic concepts and methodologies behind Green Energy.

**PHYS 2130 Electromagnetism I (3,3,0) (E)**
Prerequisite: PHYS 1122 General Physics II or consent of the instructor
Review of vector field theory, Coulomb's law, electric field, Gauss's law, electric potential, Poisson's equation, Laplace's equation, electric energy, boundary value problems, multiple expansion, electric fields in matter, magnetic field, Lorentz force, Ampére's law, and Biot Savart law.

**PHYS 2140 Electromagnetism II (3,3,0) (E)**
Prerequisite: PHYS 2130 Electromagnetism I or consent of the instructor
Magnetic fields in matter, Maxwell's equations, vector potential, gauge transformation, electromagnetic energy and momentum, Poynting's theorem, electromagnetic waves, polarization, reflection and refraction, electromagnetics waves in conducting media, dispersion, wave guides, electromagnetic radiation, retarded potential and Liénard-Wiechert potential, and relativistic electrodynamics.

**PHYS 2260 Modern Physics (3,3,0) (E)**
Prerequisite: PHYS 1121-2 General Physics I & II, or consent of the instructor
This course introduces the key concepts of 20th-century physics: special relativity, light quantization, wave-particle duality, and quantum physics.

**PHYS 2330 Mechanics (4,4,0) (E)**
Prerequisite: PHYS 1121 General Physics I or consent of the instructor
Lagrangian and Hamiltonian Mechanics, central force motion, harmonic oscillations, coupled oscillations and waves. Teaching will be illustrated with applications.

**PHYS 2340 Experimental Physics II (2,0,3)**
Prerequisite: Year II standing or consent of the instructor
This course consists of a series of laboratory experiments complementing the following courses: PHYS 1121-2 General Physics I & II.

**PHYS 2350 Atoms, Molecules, and Solids (3,3,0) (E)**
Prerequisite: PHYS 2260 Modern Physics, or consent of instructor
By using the framework of quantum physics, this course explains the rich and diverse properties of matter ranging from atoms to solids.

**PHYS 2360 Experimental Physics III (2,0,3)**
Prerequisite: Year II standing or consent of the instructor
This course consists of a series of laboratory experiments complementing the courses PHYS 2260 Modern Physics, PHYS 2130 Electromagnetism I, PHYS 3120 Statistical Physics I and PHYS 2140 Electromagnetism II.

**PHYS 3005 Atomic and Nuclear Physics (4,4,0)**
Prerequisite: PHYS 2005 Heat and Motion or consent of instructor
This course begins by introducing the key concepts of quantum physics including the wave-particle duality, the Heisenberg uncertainty principle and the Schrödinger equation. Using the language of quantum physics, students will then explore the structure and properties of atoms and nuclei. This course also introduces the basic concepts of radioactivity and nuclear reactions and lays a foundation for understanding the working principles of nuclear power generation.

**PHYS 3006 Renewable Energy Sources (3,3,0)**
Prerequisite: PHYS 2005 Heat and Motion or consent of instructor
This course covers the physics and working principles of renewable energy sources such as wind, water, biomass, and geothermal energy. Environmental impacts of the various technologies are explained. Selected examples of emerging technologies and latest developments are also discussed.

**PHYS 3007 Energy Storage, Distribution and Conservation (3,3,0)**
Prerequisite: PHYS 2005 Heat and Motion or consent of instructor
This course explores the current practice and emerging technologies in energy storage, distribution and efficient energy usage. Selected topics on novel technologies such as high power density rechargeable batteries, nonhydrogen based fuel cells, and smart energy management etc. will also be discussed.

**PHYS 3015 Structure and Properties of Matter (3,3,0)**
Prerequisite: PHYS 3005 Atomic and Nuclear Physics or consent of instructor
By using the framework of quantum physics, this course examines the structural, chemical, and electronic properties of matter, which form the basis for energy device applications.

**PHYS 3016 Energy Management (3,3,0)**
Prerequisite: PHYS 2005 Heat and Motion or consent of instructor
This course explores the basic energy management strategy to streamline energy flow and maximize energy usage efficiency in daliy life. In addition to new supply-side management topics not covered in PHYS 3007 Energy Storage, Distribution and Conservation, the course will emphasize demand-side management including economics models, energy audit procedure, user-based source planning and implementation methods.

**PHYS 3017 Green Energy Lab with LabVIEW (3,0,3)**
This course provides an introductory level to graphical programming for data acquisition and instrument control encountered by science students, using LabVIEW™ as the programming platform. This course has experiments in the area of energy generation and device characterization such that the measurements are carried out with the use of LabView for data acquisition, data conversion, information presentation and file storage and retrieval.

**PHYS 3025 Physics and Technology of Energy Conversion (3,3,0)**
Prerequisite: PHYS 2005 Heat and Motion or consent of instructor
This course provides a solid foundation of energy conversion technology which is the key to renewable energy science. The processes include the conversion of Thermal, Mechanical and Chemical energy into electricity.

**PHYS 3026 Instrumentation and Data Acquisition Laboratory (3,*,*) (E)**
Prerequisite: COMP 1005 Essence of Computing
This course introduces graphical programming for data acquisition and instrument control encountered by science students, using LabVIEW™ as the programming platform. This course provides a basic concept of hardware interface and sampling theory, and to equip students with practical skills to data acquisition, analysis and instrument control.