

NATIONAL TSING HUA UNIVERSITY
DEPARTMENT OF POWER MECHANICAL ENGINEERING
2012 Spring Semester

Course No.: PME 5130 00
Course Title: **Special Topics on Green Energies (綠能專題)**
Credits: 3 (W6W7W8 at PME R209)
Students: For senior undergraduates and postgraduates who intend to learn the modern green energy technologies
Teacher: Prof. Che-Wun Hong (洪哲文教授)
Contents:

- (1) Review of Modern Physics (Electrons+ Photons)
- (2) Review of Solid State Physics (Phonons)
- (3) Review of Boltzmann Modeling & Molecular Dynamics (Ions)
- (4) Special Topics on Solar Cells (Photons→Electrons)
- (5) Special Topics on LEDs (Electrons→Photons)
- (6) Special Topics on Thermoelectricity (Electrons↔ Phonons)
- (7) Special Topics on Batteries and Fuel Cells (Ions↔ Electrons)
6.1 Energy Storage: Li-ion Batteries
6.2 Fuel Cells
- (8) Special Topics- Invited Speech

Prerequisite: Thermodynamics, Modern Physics (preferred)
Lecture Notes: Supplement notes provided by PDF in each lecture
References:

- [1] “Modern Physics”, R.A. Serway, C.J. Moses, C.A. Moyer, 3rd Edition, Brooks/Cole, 2005
- [2] “Introduction to Solid State Physics”, C. Kittel, 8th Edition, John Wiley & Sons, Inc, 2005
- [3] “The Physics of Solar Cells”, J. Nelson, Imperial College Press, 2007
- [4] “Light-Emitting Diodes”, E.F. Schubert, Cambridge University Press, 2008
- [5] “Nanoscale Energy Transport and Conversion”, G. Chen, Oxford Univ. Press, 2005

Grades: Reports (30%)→Presentation (40%)→ Final Exam (30%)- open book