NATIONAL TSING HUA UNIVERSITY

DEPARTMENT OF POWER MECHANICAL ENGINEERING

2013 Spring Semester

Course No.: PME 5104 00

Course Title: **Engineering Quantum Mechanics (工程量子力學)**

Credits: 3 (W6W7W8 at R209)

Students: For senior undergraduates and postgraduates who intend to understand the fundamental theory of modern quantum- and nano-technologies

Teacher: Prof. Che-Wun Hong (洪哲文 教授)

Contents:

Chapter 1 Classical Mechanics to Quantum Mechanics

Chapter 2 The Time-independent Schrödinger's Equation

Chapter 3 The Time-dependent Schrödinger Equation

Chapter 4 Functions and Operators

Chapter 5 Operators and Quantum Mechanics

Chapter 6 Approximation Methods in Quantum Mechanics

Chapter 7 Time-dependent Perturbation Theory

Chapter 8 Quantum Mechanics in Solid States

Chapter 9 Angular Momentum

Chapter12 Spin

Chapter13 Identical Particles (Fermions and Bosons)*

Chapter14 Many-electron Systems*

Chapter15 Green Functions and GW Approximations*

Chapter18 Quantum Applications

References:

[1] "Quantum Mechanics for Scientists and Engineers", David A. B. Miller (Stanford University), Cambridge University Press, New York, 2009 (http://www.cambridge.org/gb/knowledge/isbn/item1175678/?site_locale=en_GB)

[2] "Quantum Chemistry", I. N. Levine, 6th Edition, Pearson Prentice Hall, New Jersey, 2009

[3] "Modern Physics", 3rd Ed., R.A. Serway, C.J. Moses, C.A. Moyer, Thomson, 2005

Grades: Exercises (30%), Report (30%), Final Exam (40%)