

Course Schedule of MST Program ,TIGP

Semester: Fall, 2009(98 學年度上學期)

Course(科目): Advanced Physical Chemistry (I)-高等物化(I)

Time(時間): 9:1 0~12:00 am, Tuesday(T2T3T4) or 10:00~11:30 am, Tuesday ,
10:00~11:30 am, Thursday(T3T4,R3R4)

Room(教室): 311 IAMS 中研院原分所 R311(台大校園)

NTHU coordinator(清大教師): 倪其焜

Course speakers(授課老師): Michitoshi Hayashi 林倫年、Chao-Ping Hsu 許昭萍、
Yen-Chu Hsu 許豔珠

Required(必修課), credit(學分): 3

Course No.(科號): TIGP727100

Date	lecturer	Date	lecturer
9/15 Tuesday 9:1 0~12:00	Prof. Michitoshi Hayashi	12/08 Tuesday 10:00~11:30	Prof. Yen-Chu Hsu
9/22 Tuesday 9:1 0~12:00	Prof. Michitoshi Hayashi	12/10 Thursday 10:00~11:30	Prof. Yen-Chu Hsu
9/29 Tuesday 9:1 0~12:00	Prof. Michitoshi Hayashi	12/15 Tuesday 10:00~11:30	Prof. Yen-Chu Hsu
10/6 Tuesday 9:1 0~12:00	Prof. Michitoshi Hayashi	12/17 Thursday 10:00~11:30	Prof. Yen-Chu Hsu
10/13 Tuesday 9:1 0~12:00	Prof. Michitoshi Hayashi	12/22 Tuesday 10:00~11:30	Prof. Yen-Chu Hsu
10/20 Tuesday 9:1 0~12:00	Prof. Michitoshi Hayashi	12/24 Thursday 10:00~11:30	Prof. Yen-Chu Hsu
10/27 Tuesday 9:1 0~10:30	Prof. Chao-Ping Hsu	12/29 Tuesday 10:00~11:30	Prof. Yen-Chu Hsu
10/29 Thursday 9:1 0~10:30	Prof. Chao-Ping Hsu	12/31 Thursday 10:00~11:30	Prof. Yen-Chu Hsu
11/03 Tuesday 9:1 0~12:00	Prof. Chao-Ping Hsu	1/5/2010 Tuesday 10:00~11:30	Prof. Yen-Chu Hsu
11/10 Tuesday 9:1 0~12:00	Prof. Chao-Ping Hsu	1/7/2010 Thursday 10:00~11:30	Prof. Yen-Chu Hsu
11/17 Tuesday 9:1 0~12:00	Prof. Chao-Ping Hsu	1/12/2010 Tuesday 10:00~11:30	Prof. Yen-Chu Hsu
11/24 Tuesday 9:1 0~12:00	Prof. Chao-Ping Hsu	1/14/2010 Thursday 10:00~11:30	Prof. Yen-Chu Hsu
12/1 Tuesday 9:1 0~12:00	Prof. Chao-Ping Hsu		

Speaker	Part 1 (Week 1-week6) Prof. Michitoshi Hayashi 林倫年教授
Class Outline	<p><The first 3 weeks></p> <p>Quantum mechanical principles</p> <ul style="list-style-type: none"> →Uncertainty principle and relations →The principle of superposition <p>The dynamics of microscopic systems</p> <ul style="list-style-type: none"> →Schrödinger equation →Wave function →Operator algebra →Eigenvalues and eigenvectors →Observables →Stationary states →The Virial Theorem <p><The last 3 weeks></p> <p>Approximations</p> <ul style="list-style-type: none"> →Perturbation method →Variational principle <p>Simple applications</p> <ul style="list-style-type: none"> → Harmonic oscillator → Diatomic systems <p>Introduction to many electron systems</p> <ul style="list-style-type: none"> → Independent particle approximation → Correlation effects
Introduction	<p>This course consists of two parts: introduction of (1) the basic principles of quantum mechanics and (2) the essentials of the solving methods of Schrödinger equation and its applications to simple and important systems.</p> <p>The first 3 weeks, we will discuss the dynamics of microscopic systems and quantum mechanical principles. The last 3 weeks, we will see how quantum mechanics works for some of the simplest systems including hydrogen atom, hydrogen molecules using several approximation techniques.</p>
Grading	<p>Problem sets will be provided weekly to trace understanding of the materials.</p> <p>The final grade will be determined by</p> <p>Problem sets (60%)</p> <p>Exam (40%)</p>
Textbook	<p>Lecture Notes</p> <p>Reference</p> <p>Atkins' Physical Chemistry</p>

Speaker	Part 2 (Week 7-week12) Prof. Chao-Ping Hsu 許昭萍教授
Class Outline	Atomic structure and atomic spectra (H atom, many-electron atoms, term symbols and selection rules) Molecular structure (The Born-Oppenheimer Approximation, valance-bond theory, molecular orbital theory.)
Introduction	
Grading	40% homeworks 60% written exam
Textbook	Atkin&DePaula, "Physical Chemistry"

Speaker	Part 3 (Week 13-week18) Prof. Yen-Chu Hsu 許豔珠教授
Class Outline	1. Symmetry and symmetry classification 2. Group theory 3. Symmetry in Quantum Theory 4. Rotational spectroscopy: selection rules, line width and stark effect. 5. Rotational spectroscopy and Astrophysics
Introduction	This part will follow closely the textbook (chapter 12 and section 1-8 of chapter 13). Additional handout will be given in the classes.
Grading	1. Homework (40%). 2. Attendance (25%). 3. Examination (35%).
Textbook	Atkin's Physical Chemistry, 8 th edition(Oxford Univ., 2006)