

Course Schedule of MST Program ,TIGP

Semester: Fall, 2012(101 學年度上學期)

Course(科目): Advanced Physical Chemistry (I)-高等物化一

Time(時間): 9:1 0~12:00 am, Tuesday(T2T3T4) or 9:1 0~12:00 am, Thursday or
10:00~12:00 am, 1:30~2:30 pm Tuesday (T3T4T6)

Room(教室): 311 IAMS 中研院原分所 R311(台大校園)

A507 Institute of Chemistry in Academia Sinica(only for Prof. Chao-Ping Hsu)

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

Credit(學分): 3

Date	lecturer	classroom
9/18 Tuesday 9:1 0~12:00	Prof. Chao-Ping Hsu	A507,IOC
9/25 Tuesday 9:1 0~12:00	Prof. Chao-Ping Hsu	A507,IOC
10/2 Tuesday 9:1 0~12:00	Prof. Chao-Ping Hsu	A507,IOC
10/9 Tuesday 9:1 0~12:00	Prof. Chao-Ping Hsu	A507,IOC
10/16 Tuesday 9:1 0~12:00	Prof. Chao-Ping Hsu	A507,IOC
10/23 Tuesday 9:1 0~12:00	Prof. Chao-Ping Hsu	A507,IOC
11/01 Thursday 9:1 0~12:00	Prof. Michitoshi Hayashi	R311,IAMS
11/08 Thursday 9:1 0~12:00	Prof. Michitoshi Hayashi	R311,IAMS
11/15 Thursday 9:1 0~12:00	Prof. Michitoshi Hayashi	R311,IAMS
11/22 Thursday 9:1 0~12:00	Prof. Michitoshi Hayashi	R311,IAMS
11/29 Thursday 9:1 0~12:00	Prof. Michitoshi Hayashi	R311,IAMS
12/06 Thursday 9:1 0~12:00	Prof. Michitoshi Hayashi	R311,IAMS
12/11 Tuesday 10:00~12:00	Prof. Yen-Chu Hsu	R311,IAMS
12/11 Tuesday 13:30~14:30	Prof. Yen-Chu Hsu	R311,IAMS
12/18 Tuesday 10:00~12:00	Prof. Yen-Chu Hsu	R311,IAMS
12/18 Tuesday 13:30~14:30	Prof. Yen-Chu Hsu	R311,IAMS
12/25 Tuesday 10:00~12:00	Prof. Yen-Chu Hsu	R311,IAMS
12/25 Tuesday 13:30~14:30	Prof. Yen-Chu Hsu	R311,IAMS
1/08/2013 Tuesday 10:00~12:00	Prof. Yen-Chu Hsu	R311,IAMS
1/08/2013 Tuesday 13:30~14:30	Prof. Yen-Chu Hsu	R311,IAMS
1/15/2013 Tuesday 10:00~12:00	Prof. Yen-Chu Hsu	R311,IAMS
1/15/2013 Tuesday 13:30~14:30	Prof. Yen-Chu Hsu	R311,IAMS

Speaker	Part 1(Week1 ~ Week6) 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 1 (Week 7-week12) 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 Problem sets (60%) Exam (40%)</p>
Textbook	<p>Lecture Notes Reference Atkins' Physical Chemistry</p>

Speaker	<p>Part 2 (Week 13-week17) Prof. Yen-Chu Hsu 許豔珠教授</p>
Class Outline	<ol style="list-style-type: none"> 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	<p>This part will follow closely the textbook (chapter 12 and section 1-8 of chapter 13). Additional handout will be given in the classes.</p>
Grading	<ol style="list-style-type: none"> 1. Homework (40%). 2. Attendance (25%). 3. Examination (35%).
Textbook	<p>Atkin's Physical Chemistry, 8th edition(Oxford Univ., 2006)</p>