

# 物理化学(2) 课程教学大纲

## Course Outline

课程基本信息 (Course Information)					
课程代码 (Course Code)	CA219	*学时 (Credit Hours)	64	*学分 (Credits)	4
*课程名称 (Course Title)	(中文) 物理化学 (2)				
	(英文) Physical Chemistry (2)				
*课程性质 (Course Type)	专业必修				
授课对象 (Target Audience)	致远学院 2016 级化学专业				
*授课语言 (Language of Instruction)	中英文				
*开课院系 (School)	致远学院				
先修课程 (Prerequisite)	无机化学、有机化学、高等数学含线性代数、大学物理				
授课教师 (Instructor)	陈启明	课程网址 (Course Webpage)			
*课程简介 (Description)	物理化学 (2) 是一门在原子、分子水平上认识物质微观结构的课程, 内容涵盖量子力学基本原理及其在化学中的应用, 包括原子结构、分子结构以及相应的光谱学原理和技术。对于一名已经完成无机化学、有机化学、高等数学含线性代数、大学物理等课程修习的化学专业的学生来说, 这是一门让自己成为现代化学专门人才的必修课程。				
*课程简介 (Description)	Physical chemistry II is a course for the studies of microscopic structures of matters at the atomic and molecular levels. This course will develop a fundamental understanding of quantum mechanics and their applications in chemical systems, particularly in atomic structure, molecular structure and molecular spectroscopy involving principles, experimental techniques and applications. Students are required to have completed in advanced mathematics, linear algebra, college physics, inorganic chemistry and organic chemistry as pre-courses.				

课程教学大纲 (course syllabus)

\*学习目标(Learning Outcomes)

1. The basic knowledge of quantum mechanics
2. The quantum theory of motion
3. Atomic structure and atomic spectra
4. Molecular structure
5. Molecular symmetry
6. Rotational and vibrational spectra
7. Electronic spectra
8. Magnetic resonance

\*教学内容、进度安排及要求  
(Class Schedule & Requirements)

教学内容	学时	教学方式	作业及要求	基本要求	考查方式
1 Course Introduction	2				
2 The origins of quantum mechanics	2				
3 Dynamics of microscopic systems	2				
4 The principles of quantum mechanics	2				
5 Translational motion	2				
6 Vibrational motion	2				
7 Rotational motion	2				
8 The structure of hydrogenic atoms	2				
9 The structure of many-electron atoms	2				
10 Atomic spectra	2				
11 Valence bond theory	2				
12 Molecular orbital theory	2				
13 Homo-nuclear diatomic molecules	2				
14 Hetero-nuclear diatomic molecules	2				
15 Polyatomic molecules	2				
16 Midterm exam	2				
17 Operations and symmetry elements	2				

	14 Group theory	2				
	19 Applications of symmetry	2				
	20 General features of spectroscopy	2				
	21 Rotational spectra	2				
	22 The vibration of diatomic molecules	2				
	23 The vibrations of polyatomic molecules	2				
	24 The characteristics of electronic transitions	2				
	25 The fates of electronically excited states	2				
	26 Photoelectron spectroscopy	2				
	27 Lasers	2				
	28 The effect of magnetic fields on electrons and nuclei	2				
	29 Nuclear magnetic resonance	2				
	30 Pulse techniques in NMR	2				
	31 Electron spin resonance	2				
	32 Final exam	2				
*考核方式 (Grading)	Homework assignments, 20%; Unit exams, 30%; Final exam, 50%					
*教材或参考资料 (Textbooks & Other Materials)	Atkins' Physical Chemistry, Peter Atkins, Julio de Paula, Oxford Press, 2014, ISBN: 9780199697403					
其它 (More)						
备注 (Notes)						

备注说明:

1. 带\*内容为必填项。
2. 课程简介字数为 300-500 字; 课程大纲以表述清楚教学安排为宜, 字数不限。