

课程详述

COURSE SPECIFICATION

以下课程信息可能根据实际授课需要或在课程检讨之后产生变动。如对课程有任何疑问，请联系授课教师。

The course information as follows may be subject to change, either during the session because of unforeseen circumstances, or following review of the course at the end of the session. Queries about the course should be directed to the course instructor.

1.	课程名称 Course Title	化学原理 General Chemistry
2.	授课院系 Originating Department	化学系 Departments of Chemistry
3.	课程编号 Course Code	CH103
4.	课程学分 Credit Value	4
5.	课程类别 Course Type	通识必修课程 General Education (GE) Required Courses
6.	授课学期 Semester	秋季 Fall
7.	授课语言 Teaching Language	中英双语 English & Chinese 或 英语 English
8.	授课教师、所属学系、联系方式 (如属团队授课, 请列明其他授课教师) Instructor(s), Affiliation & Contact (For team teaching, please list all instructors)	郑智平 讲席教授, 化学系; 谭斌 讲席教授, 化学系; 许宗祥 副教授, 化学系; 钟龙华 教授, 化学系; 权泽卫 教授, 化学系; 张元竹 副教授, 化学系; 顾均 助理教授, 化学系; 王杰 助理教授, 化学系 Dr. Zhiping Zheng, Chair Professor, zhengzp@sustech.edu.cn, Dept. of Chem. Dr. Bin Tan, Chair Professor, tanb@sustech.edu.cn, Dept. of Chem. Dr. Zong-Xiang Xu, Associate Professor, xuzx@sustech.edu.cn, Dept. of Chem. Dr. Lung Wa Chung, Professor, oscarchung@sustech.edu.cn, Dept. of Chem. Dr. Zewei Quan, Professor, quanzw@sustech.edu.cn, Dept. of Chem. Dr. Yuanzhu Zhang, Associate Professor, zhangyz@sustech.edu.cn, Dept. of Chem. Dr. Jun Gu, Assistant Professor, guj6@sustech.edu.cn, Dept. of Chem. Dr. Jie Wang, Assistant Professor, wangjie@sustech.edu.cn, Dept. of Chem.
9.	实验员/助教、所属学系、联系方式	待公布 To be announced

Tutor/TA(s), Contact						
10.	选课人数限额(可不填) Maximum Enrolment (Optional)					
11.	授课方式 Delivery Method	讲授 Lectures	习题/辅导/讨论 Tutorials	实验/实习 Lab/Practical	其它(请具体注明) Other (Please specify)	总学时 Total
	学时数 Credit Hours	64				64
12.	先修课程、其它学习要求 Pre-requisites or Other Academic Requirements	无 NA				
13.	后续课程、其它学习规划 Courses for which this course is a pre-requisite	本课程为通修通识必修课, 适合化学和非化学专业的学生学习。 This is a compulsory course for general study, and is therefore suitable for chemistry and non-chemistry majors.				
14.	其它要求修读本课程的学系 Cross-listing Dept.	所有系 All other departments				

教学大纲及教学日历 SYLLABUS

15. 教学目标 Course Objectives

化学原理课程是旨在为主修理科和工科专业的本科生提供对化学原理的基本理解而开设的课程。本课程的开设也期望能吸引更多的本科生在高年级能从事化学相关的研究。

化学原理课程的授课主题包括: 原子和元素、分子和电子结构、物质状态、化学键、化学平衡、动力学和热力学、化学计量学、水溶液化学、酸和碱、氧化和还原等基本化学概念。

由于化学是一门实验学科, 对本科生开展化学原理教学的一个特点在于强调化学实验的重要性, 并为学生在安全化学实验室开展实验训练创造一切可能的条件。此外, 学生应该通过本课程的教学认知到: 化学是一门有用的学科, 它有助于我们再分子水平理解我们周围的世界, 并为我们的日常生活创造新的材料, 新的事物。

General Chemistry is designed to give a general but fundamental understanding of chemical principles to undergraduate students majoring in science and engineering. General Chemistry also aims to attract more undergraduate students to carry out chemical research at their seniors.

The topics of General Chemistry include: atoms and elements, molecular and electronic structures, states of matter, bonding, chemical equilibriums, kinetics and thermodynamics, stoichiometry, aqueous solution chemistry, acids and bases, oxidation and reduction, and so on.

As chemistry is an experimental science, a very special point for teaching General Chemistry for undergraduate students is to emphasize the experimental aspect of a chemical reaction and create every possible condition for students to practice the reactions in a safe chemical laboratory. Also, the students should be educated that chemistry is practically useful and it helps us to understand the world around us at the molecular level and to create every materials and events in our daily life.

16. 预达学习成果 Learning Outcomes

通过学习化学原理，学生可以了解化学学科最基本的原理（包括微观理论、统计理论和宏观理论）及其在化学和化工中的应用，融合了无机化学、有机化学、分析化学和物理化学和高分子化学的内容，并且适当增加了化学发展的前沿动态。

Students should understand the basic principles of chemistry based on microscopic theory, statistical theory and macroscopic theory and the application in all aspects of chemistry, which includes inorganic chemistry, organic chemistry, analytical chemistry, physical chemistry and polymer as well as the frontier in chemical research and development (new medicine, new materials, and new energy).

17. 课程内容及教学日历（如授课语言以英文为主，则课程内容介绍可以用英文；如团队教学或模块教学，教学日历须注明主讲人）

Course Contents (in Parts/Chapters/Sections/Weeks. Please notify name of instructor for course section(s), if this is a team teaching or module course.)

Class Content (<i>Chemistry: The Central Science</i> 12th Ed.)
第一章. 物质和测量/ 2 学时 Chapter 1. Introduction: Matter and Measurement/2 credit hours
第二章. 原子, 分子和离子/2 学时 Chapter 2. Atoms, Molecules, and Ions/2 credit hours
第三章. 化学计量: 用化学式和方程计算/2 学时 Chapter 3. Stoichiometry: Calculations with Chemical Formulas and Equations/2 credit hours
第四章. 水溶液中的反应/2 学时 Chapter 4. Reactions in Aqueous Solution/2 credit hours
第五章. 热化学/4 学时 Chapter 5. Thermochemistry/4 credit hours
第六章. 原子的电子结构/6 学时 Chapter 6. Electronic Structure of Atoms/6credit hours
第七章. 元素的周期性性质/4 学时 Chapter 7. Periodic Properties of the Elements/4 credit hours
第八章. 化学键的基本概念/4 学时 Chapter 8. Basic Concepts of Chemical Bonding/4 credit hours
第九章. 分子几何构型与价键理论/4 学时 Chapter 9. Molecular Geometry and Bonding Theories/4 credit hours
第十章. 气体/2 学时 Chapter 10. Gases /2 credit hours
期中考试 Mid-Term Exam
第十一章. 液体和分子间作用力/4 学时 Chapter 11. Liquids and Intermolecular Forces/4 credit hours
第十三章. 溶液性质/4 学时 Chapter 13. Properties of Solutions/4 credit hours
第十四章. 化学动力学/4 学时 Chapter 14. Chemical Kinetics/4 credit hours
第十五章. 化学平衡/4 学时 Chapter 15. Chemical Equilibrium/5credit hours
第十六章. 酸碱平衡/4 学时 Chapter 16. Acid-Base Equilibria/4 credit hours
第十七章. 水平衡其他性质/2 学时 Chapter 17. Additional Aspects of Aqueous Equilibria/2 credit hours
第十九章. 化学热力学/4 学时 Chapter 19. Chemical Thermodynamics/4 credit hours
第二十章. 电化学/4 学时 Chapter 20. Electrochemistry/4 credit hours

第二十三章. 过渡金属和配位化学/2 学时 Chapter 23. Transition Metals and Coordination Chemistry/2 credit hours
期末考 Final exam

18. 教材及其它参考资料 Textbook and Supplementary Readings

Chemistry: The Central Science (12th Edition, 2011)

化学: 中心科学 (第 12 版, 2011)

Brown | LeMay Jr. | Bursten | Murphy | Woodward, Pearson Prentice Hall (ISBN 9780321749833)

Online System for Homework Assignment:

www.masteringchemistry.com

Free Web Resources:

(1) Whatever you want for General Chemistry:

<http://www.chem1.com/chemed/genchem.shtml>

(2) Chemical Principles (3rd Edition, 1979)

Richard Dickerson, Harry Gray and Gilbert Haight

Downloadable at: <http://caltechbook.library.caltech.edu/178/>

课程评估 ASSESSMENT

19. 评估形式 Type of Assessment	评估时间 Time	占考试总成绩百分比 % of final score	违纪处罚 Penalty	备注 Notes
出勤 Attendance				
课堂表现 Class Performance		5		
小测验				

Quiz				
课程项目 Projects				
平时作业 Assignments		30		
期中考试 Mid-Term Test		25		
期末考试 Final Exam		30		
期末报告 Final Presentation		10		
其它（可根据需要 改写以上评估方 式） Others (The above may be modified as necessary)				

20. 记分方式 GRADING SYSTEM

- A. 十三级等级制 Letter Grading
 B. 二级记分制（通过/不通过） Pass/Fail Grading

课程审批 REVIEW AND APPROVAL

21. 本课程设置已经过以下责任人/委员会审议通过
This Course has been approved by the following person or committee of authority

化学系教学指导委员会
Teaching committee of the chemistry department