

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	分析化学实验 I Analytical Chemistry Laboratory I
2.	授课院系 Originating Department	化学系 Chemistry Department
3.	课程编号 Course Code	CH217
4.	课程学分 Credit Value	2
5.	课程类别 Course Type	专业基础课 Major Foundational Courses
6.	授课学期 Semester	秋季 Fall
7.	授课语言 Teaching Language	中英双语 English & Chinese
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)	<p>李晓华, 化学系, 工程师 第一教学楼 537 室 lixh3@sustech.edu.cn</p> <p>朱秀珍, 化学系, 实验师 荔园 1 栋 306 室 zhuxz@sustech.edu.cn</p> <p>LI Xiao-Hua, Chemistry Department, Lab Engineer Rm.537, No.1 Teaching Bldg. lixh3@sustech.edu.cn</p> <p>ZHU Xiu-Zhen, Chemistry Department, Teaching Technician Rm.306, BLK1, LYCHEE HILLS zhuxz@sustech.edu.cn</p>
9.	实验员/助教、所属学系、联系方式 Tutor/TA(s), Contact	无 NA

10.	选课人数限额(可不填) Maximum Enrolment (Optional)	80				
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	分析化学 I (CH216)				
13.	后续课程、其它学习规划 Courses for which this course is a pre-requisite	分析化学 II (CH218)、分析化学实验 II (CH219)				
14.	其它要求修读本课程的学系 Cross-listing Dept.					

教学大纲及教学日历 SYLLABUS

15. 教学目标 Course Objectives

《分析化学实验》是化学专业学生的专业必修课之一，是理论课的延伸和发展，也是从事生命科学、环境、医药、材料、农业和地质等学科工作的基础。通过本课程的学习，旨在培养学生掌握基本概念和基本理论；培养学生从事理论研究和实际工作的能力。巩固学生的分析化学基础理论知识，掌握基本实验操作，培养严谨的科学态度以及独立思考、分析与解决问题的能力。

Analytical Chemistry Experiment is one of the required courses for chemistry majors. It is the extension and development of theoretical courses. It is also the basis for work in life sciences, environmental science, medicine, materials, agriculture and geology. Through the study of this course, our aim is to train students to master basic concepts and basic theories, to develop students' ability to engage in theoretical research and practical work. Consolidate the students' basic theoretical knowledge of analytical chemistry, master basic experimental operations, develop rigorous scientific attitudes, and the ability to think, analyze, and solve problems independently.

16. 预达学习成果 Learning Outcomes

本课程以实验基础训练为目的，内容涵盖分析化学基本理论知识以及常用的分析仪器（容量分析仪器的校准，电导率仪、pH计的校准及样品测定，通过该实验让学生熟悉了解分析化学实验所用基本玻璃仪器和电子天平的使用；电位法滴定 HCl 和 HAc 混合液，氧化还原滴定和胃舒平药片中铝含量的测定三个滴定实验，通过这三个滴定实验让学生掌握基本的滴定操作和样品预处理方法；邻二氮菲分光光度法测定污水中铁的含量，荧光分光光度法分析检测，K₃Fe(CN)₆ 在玻碳电极上的氧化还原，化学发光法分析检测，差分脉冲伏安法测定维生素 C 片中抗坏血酸含量，紫外光谱分析和定量测定氨基酸类物质以及红外光谱法测定未知有机化合物，七个仪器实验让学生掌握几种常用分析仪器的使用；期末实验操作考核，通过一学期的实验训练，在经过十二个独立分析实验操作培训的基础上对学生的基本实验操作进行实验操作考核）。通过分析化学实验课程的学习，锻炼学生实验动手能力，培养学生的实验技巧和从事科学研究的基本素质。

This course is designed for experimental basic training, it covers basic theoretical knowledge of analytical chemistry as well as common analytical instruments. (Calibration of Analysis Glassware, Calibration of Electrical Conductibility, pH Meter and Sample Determination, which allows students to familiarize themselves with the use of basic glass instruments and electronic balances used in analytical chemistry experiments. Potentiometric Titration of HCl and HAc Mixtures, Redox titration and Determination of Aluminum in Gastropin Tablets. These three titration experiments allow students to master basic titration operations and sample pretreatment methods. Colorimetric Fe Analysis, Fluorescence Spectrophotometric Analysis, Redox K₃Fe(CN)₆ on Glassy Carbon (GC) Electrode, Chemiluminescence Analysis and Detection, Determination of Ascorbic Acid in Vitamin C Tablets by Differential Pulse Voltammetry, UV-vis Spectrum Analysis and Quantitative Determination of Amino Acids, Infrared Spectrometry Unknown Organic Compound. Through

these seven instrument experiments, students will master the use of these commonly used analytical instruments. At the end of the period, the experimental operation assessment will be carried out. Through one semester of experimental training, after the 12 independent analysis and experimental operation training, the basic experimental operation of the students will be tested in the experimental operation. Through the study of analysis chemistry experiment courses, the students' experimental ability is exercised, and the students' experimental skills and basic qualities of scientific research are cultivated.

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.)

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| 1. 绪论 | 3 学时 |
| 2. 容量分析仪器的校准 | 4 学时 |
| 3. 电导率仪、pH 计的校准及样品测定 | 4 学时 |
| 4. 电位法滴定 HCl 和 HAc 混合液 | 4 学时 |
| 5. 氧化还原滴定 | 4 学时 |
| 6. 胃舒平药片中铝含量的测定 | 5 学时 |
| 7. 邻二氮菲分光光度法测定污水中铁的含量 | 5 学时 |
| 8. 荧光分光光度法分析检测 | 5 学时 |
| 9. $K_3Fe(CN)_6$ 在玻碳电极上的氧化还原 | 5 学时 |
| 10. 化学发光分析检测 | 5 学时 |
| 11. 差分脉冲伏安法测定维生素 C 片中抗坏血酸含量 | 5 学时 |
| 12. 紫外光谱分析和定量测定氨基酸类物质 | 5 学时 |
| 13. 红外光谱法测定未知有机化合物 | 5 学时 |
| 14. 设计实验 | 5 学时 |
| 1. Introduction | 3 Hours |
| 2. Calibration of Analysis Glassware | 4 Hours |
| 3. Calibration of Electrical Conductibility, pH Meter and Sample Determination | 4 Hours |
| 4. Potentiometric Titration of HCl and HAc Mixtures | 4 Hours |
| 5. Redox Titration | 4 Hours |
| 6. Determination of Aluminum in Gastropin Tablets | 5 Hours |

7. Colorimetric Fe Analysis	5 Hours
8. Fluorescence Spectrophotometric Analysis	5 Hours
9. Redox $K_3Fe(CN)_6$ on Glassy Carbon (GC) Electrode	5 Hours
10. Chemiluminescence Analysis and Detection	5 Hours
11. Determination of Ascorbic Acid in Vitamin C Tablets by Differential Pulse Voltammetry	5 Hours
12. UV-vis Spectrum Analysis and Quantitative Determination of Amino Acids	5 Hours
13. Infrared Spectrometry Unknown Organic Compound	5 Hours
14. Design Experiments	5 Hours

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

《分析化学实验》和《Analytical Chemistry Experiment》

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				
小测验 Quiz				
课程项目 Projects				
平时作业 Assignments				
期中考试 Mid-Term Test				
期末考试 Final Exam				
期末报告 Final Presentation				
其它(可根据需要 改写以上评估方 式) Others (The above may be modified as necessary)	一学期 One semester	分析化学实验总成绩 = $80\% \times$ 平时实验成绩 + $20\% \times$ 期末实验操作考试成绩。 (1)平时实验成绩: 每一个实验满分 100 分 = 预习报告(10 分) + Quiz(10 分) + 课堂表现 (20 分) + 实验操作(30 分) + 实验报告(30 分)。所有 12 个分析化学实验的平时成绩占总成绩的 80%。若有一个实验没完成, 则该实验的成绩为 0。		

	<p>(2): 期末实验操作考试成绩满分 100 分, 占总成绩的 20%。 (2) Overall = 80% experiment score at ordinary times + 20% final experiment operation test (1) Experiment score at ordinary times: 100 points for each experiment = Preview report (10) + quiz (10) + behaviors in classroom (5) + environmental cleaning (5) + ability in experiment operation (40) + lab report (30) (2) Final experimental operation test, 100 points total.</p>		
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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

