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Ⅰ Analytical Chemistry Ⅰ
2.	授课院系 Originating Department	化学系 Department of Chemistry
3.	课程编号 Course Code	CH216
4.	课程学分 Credit Value	3
5.	课程类别 Course Type	专业基础课 Major Foundational Course
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）	谢小江副教授，化学系 Dr. Xiaojiang Xie, Associate Professor, Department of Chemistry Email：xiexj@sustech.edu.cn 郝瑞助理教授，化学系 Dr. Rui Hao, Assistant Professor, Department of Chemistry Email：haor@sustech.edu.cn
9.	实验员/助教、所属学系、联系方式 Tutor/TA(s), Contact	阮菊香，科研教学助理，化学系 Juxiang Ruan, Research and Teaching Assistant, Department of Chemistry Email：ruanjx2019@sustech.edu.cn
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	48	0	0	复习、考试（2 周）	48

Credit Hours				Revision & Exam (2 weeks)	

12. 先修课程、其它学习要求 Pre-requisites or Other Academic Requirements	化学原理 A（CH101A）
13. 后续课程、其它学习规划 Courses for which this course is a pre-requisite	本课程为化学系的专业基础课，生物、环境和材料系等相关院系的学生也建议选修。 This fundamental course should be taken by students in chemistry department, and is highly recommended to students in related departments such as biology, environment and material.
14. 其它要求修读本课程的学系 Cross-listing Dept.	无 NA

教学大纲及教学日历 SYLLABUS

15. 教学目标 Course Objectives

分析化学 I 是化学专业的基础课程，本课程包括经典的化学定量分析及基础仪器分析两部分内容：由分析化学的基础知识及基本操作、酸碱平衡及滴定、络合滴定、重量分析及沉淀滴定、氧化还原及电位滴定、仪器分析简介、电极电位和电位法、伏安法分析及极谱法、电化学传感器与（电）化学发光、光谱分析简介、紫外-可见吸收光谱法、红外与拉曼光谱分析。通过本课程的学习要求学生系统地掌握分析化学的基本原理和方法，加深对其它化学课程内容的理解，并具备应用分析化学的基本原理对实际样品进行定性和定量分析，以及解决实际分析问题的能力。

Analytical chemistry I is a foundational course for undergraduates majored in chemistry. This course includes classical chemical quantitative analysis and basic instrumental analysis. The major content includes tools and operations in analytical chemistry, acid-base equilibria and titrations, complexometric reactions and titrations, gravimetric analysis and precipitation equilibria, precipitation reactions and titrations, redox and potentiometric titrations, introduction to instrumental analysis, electrode potential and potentiometry, voltammetry and polarography, electrochemical sensors and (electro)chemiluminescence, introduction to spectroscopy, UV-visible spectroscopy, IR and Raman spectroscopy. This course is intended to provide students with an understanding of basic principles and instrumentations of analytical chemistry that are important in chemistry, biology, material, medical, and engineering.

16. 预达学习成果 Learning Outcomes

该课程将帮助学生提高对分析化学分离、检测方法的了解和认识，并对相关的定性和定量分析有深入地理解。通过本课程的学习，初步具备选择化学分析方法、正确评价和表达分析结果的能力，树立严格的“量”的概念，加强科学思维和科研创新能力培养，提高综合运用所学化学分析知识解决实际问题的能力。

The course will help students develop the ability to handle basic problems including qualitative and quantitative analysis. Through the study of this course, students will have the ability to choose appropriate analytical method, correctly evaluate and express the analytical results, and thereby build the concept of strict "quantity". What's more, this course plays an important role in training students' abilities of scientific mind, research and innovation, improving the abilities of solving practical problems with the knowledge they have learned.

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.)

1. 分析化学基础及前言介绍　2 学时

2. 分析化学的基本实验设备及操作　2 学时

3. 酸碱平衡　3 学时

4. 络合反应及络合滴定　3 学时

5. 重量分析及沉淀平衡　2 学时

6. 沉淀反应及滴定　2 学时

7. 氧化还原及电位滴定　2 学时

8. 仪器分析简介　2 学时

9. 电极电位和电位法　4 学时

10. 库伦法和物质传输　3 学时

11. 伏安法分析及极谱法　3 学时

12. 电化学传感器与（电）化学发光　3 学时

13. 光谱分析简介　3 学时

14. 紫外-可见吸收光谱法　3 学时

15. 荧光光谱法　3 学时

16. 红外光谱与拉曼光谱分析　3 学时

17. 荧光成像技术入门　3 学时

18. 总结与答疑　2 学时

1. Introduction to Analytical Chemistry　2 Hours

2. Basic tools and operations of Analytical Chemistry　2 Hours

3. Acid-base equilibria　3 Hours

4. Complexometric reactions and titrations　3 Hours

5. Gravimetric analysis and precipitation equilibria　2 Hours

6. Precipitation reactions and titrations　2 Hours

7. Redox and potentiometric titrations　2 Hours

8. Introduction to instrumental analysis　2 Hours

9. Electrode potential and potentiometry 4 Hours

10. Coulometry and mass Transfer 3 Hours

11. Voltammetry and polarography 3 Hours

12. Electrochemical sensors and (electro)chemiluminescence 3 Hours

13. Introduction to spectroscopy 3 Hours

14. UV-visible spectroscopy 3 Hours

15. Fluorescence spectroscopy 3 Hours

16. IR spectroscopy and Raman spectroscopy 3 Hours

17. Basics of fluorescence imaging 3 Hours

18. Summary and discussion, Q&A 2 Hours

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

Required: Analytical chemistry -- Seventh edition / Gary D. Christian, University of Washington

Recommended: 武汉大学，分析化学（上、下册）（第五版），高等教育出版社，2006

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		5		
课堂表现 Class Performance				
小测验 Quiz		2.5		
课程项目 Projects				
平时作业 Assignments		2.5		
期中考试 Mid-Term Test		30		
期末考试 Final Exam		60		
期末报告 Final Presentation		n/a		

其它（可根据需要改写以上评估方式） **Others (The above may be modified as necessary)**		n/a		

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