

Tamkang University Academic Year 112, 2nd Semester Course Syllabus

Course Title	INSTRUMENTAL ANALYSIS	Instructor	CHIA-CHI HUANG
Course Class	TSCCB3A DEPARTMENT OF CHEMISTRY-CHEMISTRY AND BIOCHEMISTRY DIVISION, 3A	Details	<ul style="list-style-type: none"> ◆ General Course ◆ Required ◆ 2nd Semester
Relevance to SDGs	SDG4 Quality education SDG5 Gender equality		
Departmental Aim of Education			
I. Cultivate the basic professional knowledge and experimental techniques. II. Cultivate the capacity of practical implementation. III. Cultivate professional ethics and lifelong learning.			
Subject Departmental core competences			
A. Possess basic scientific knowledge such as mathematics and physics, and apply them to related fields in chemistry.(ratio:10.00) B. Possess basic knowledge in chemistry such as organic, physical, inorganic, and instrumental analysis, and extend them into biochemistry, material chemistry, and related chemistry. (ratio:50.00) C. Possess basic experimental chemistry techniques and apply them to other chemistry-related experimental works.(ratio:10.00) D. Possess collecting and analyzing chemistry-related information and apply them to basic research ability and seminar participation.(ratio:20.00) E. Possess the professional ethics in chemistry workplace and apply them to solve chemistry problem.(ratio:10.00)			
Subject Schoolwide essential virtues			
1. A global perspective. (ratio:5.00) 2. Information literacy. (ratio:20.00) 3. A vision for the future. (ratio:20.00) 4. Moral integrity. (ratio:10.00) 5. Independent thinking. (ratio:15.00) 6. A cheerful attitude and healthy lifestyle. (ratio:15.00)			

7. A spirit of teamwork and dedication. (ratio:5.00)

8. A sense of aesthetic appreciation. (ratio:10.00)

**Course
Introduction**

This course focuses on modern Instrumental analysis in relation to separation and spectroscopy.

For the spring semester of 2024, we will learn the principles and practices of separation methods and their applications in molecular spectroscopy.

The correspondences between the course's instructional objectives and the cognitive, affective, and psychomotor objectives.

Differentiate the various objective methods among the cognitive, affective and psychomotor domains of the course's instructional objectives.

I. Cognitive : Emphasis upon the study of various kinds of knowledge in the cognition of the course's veracity, conception, procedures, outcomes, etc.

II.Affective : Emphasis upon the study of various kinds of knowledge in the course's appeal, morals, attitude, conviction, values, etc.

III.Psychomotor: Emphasis upon the study of the course's physical activity and technical manipulation.

No.	Teaching Objectives	objective methods
1	After completing this course, students are expected to understand the sciences behind current separation technology, the analysis of molecular spectroscopy, and their combination in applications. This course also prepares students for the future applications of modern instrumental analyses in their work or research.	Cognitive

The correspondences of teaching objectives : core competences, essential virtues, teaching methods, and assessment

No.	Core Competences	Essential Virtues	Teaching Methods	Assessment
1	ABCDE	12345678	Lecture	Testing, Study Assignments, Report(including oral and written), exams

Course Schedule

Week	Date	Course Contents	Note
1	113/02/19~ 113/02/25	Nuclear Magnetic Resonance (NMR) spectroscopy	

2	113/02/26 ~ 113/03/03	Nuclear Magnetic Resonance (NMR) spectroscopy; National Holiday (228)	
3	113/03/04 ~ 113/03/10	An introduction to chromatographic separation	
4	113/03/11 ~ 113/03/17	Gas chromatography (GC)	
5	113/03/18 ~ 113/03/24	Gas chromatography (GC)	
6	113/03/25 ~ 113/03/31	High-performance liquid chromatography (HPLC)	
7	113/04/01 ~ 113/04/07	National Holidays	
8	113/04/08 ~ 113/04/14	High-performance liquid chromatography (HPLC)	
9	113/04/15 ~ 113/04/21	Midterm Exam Week	
10	113/04/22 ~ 113/04/28	Supercritical fluid chromatography and extraction	
11	113/04/29 ~ 113/05/05	Capillary electrophoresis (CE)	
12	113/05/06 ~ 113/05/12	Capillary electrophoresis (CE)	
13	113/05/13 ~ 113/05/19	Electroanalytical chemistry	
14	113/05/20 ~ 113/05/26	Electroanalytical chemistry	
15	113/05/27 ~ 113/06/02	Review	
16	113/06/03 ~ 113/06/09	Characterization of carotenoids from pineapples: An integrated and modular experiment for practical learning of UV-Vis spectroscopy, chromatography, mass spectrometry, and chemometrics	
17	113/06/10 ~ 113/06/16	Final Exam Week (Date:113/6/11-113/6/17); 6/10 National Holiday	
18	113/06/17 ~ 113/06/23	Flex week, learning activities should be arranged.	
Key capabilities		self-directed learning Problem solving	
Interdisciplinary		STEAM course (S:Science, T:Technology, E:Engineering, M:Math, A field:Integration of Art and Humanist)	

Distinctive teaching	instruments
Course Content	Logical Thinking
Requirement	There will be no quizzes in this course. Homework will be announced in the iClass system, with at least one-month leeway before it' s due. The time is more than enough for you to work. Please take responsibility for your homework and turn in your answers to each question before the deadline, and make sure your answers are uploaded in the correct layer of iClass. As an adult and to be fair to every student, no one will be given a second chance after the deadline.
Textbooks and Teaching Materials	Using teaching materials from other writers:Textbooks Name of teaching materials: Principles of Instrumental Analysis, Seventh Edition
References	Journals
Grading Policy	◆ Attendance : 20.0 % ◆ Mark of Usual : % ◆ Midterm Exam : 20.0 % ◆ Final Exam : 30.0 % ◆ Other 〈Homework〉 : 30.0 %
Note	This syllabus may be uploaded at the website of Course Syllabus Management System at http://info.ais.tku.edu.tw/csp or through the link of Course Syllabus Upload posted on the home page of TKU Office of Academic Affairs at http://www.acad.tku.edu.tw/CS/main.php . ※ Unauthorized photocopying is illegal. Using original textbooks is advised. It is a crime to improperly photocopy others' publications.