The Hong Kong University of Science and Technology (Guangzhou)

UFUG1303 Course Syllabus

[Course Title] Honors Chemistry II

[Course Code] UFUG1303

[No. of Credits] 3

[Any pre-/co-requisites] Students should have taken Honors Chemistry I

Instructor 1:

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Instructor 2:

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Course Description

This course is designed for students who have taken Honors Chemistry I and want to continue to expand their chemistry knowledge. It will cover topics related to chemical kinetics and equilibrium, acids and bases, acid-base equilibria, solubility and complex ion equilibria, entropy and free energy, electrochemistry, representative elements and their chemistries, transition metals and coordination chemistry, organic molecules and organic reactions.

Intended Learning Outcomes (ILOs)

By the end of this course, students should be able to:

1) Explain the principles of chemical kinetics and equilibrium; (K)

2) Describe different definitions of acid and base theories and understand solubility, acid-base equilibrium, and complex ion equilibrium; (K, S)

3) Know the definition of entropy, enthalpy, and free energy. Apply the laws of thermodynamics to determine if physical and chemical changes are spontaneous; (K, S)

4) Describe redox reactions, use electrochemical data to predict the spontaneity of redox reactions, and comprehend the structures of electrochemical cells; (K, S)

5) Identify representative elements and comprehend properties of selected representative compounds; (K)

6) Identify transition metals and comprehend properties of transition metal compounds; (K)

7) Identify organic molecules and learn various types of organic reactions; (K)

8) Critically solve problems; (S)

9) Demonstrate the awareness of chemical knowledge relevant to social and daily life such as energy and environmental issues. (V)

(K/S/V: K, knowledge or content related outcome; S, academic skill or competency outcome; V, values and attitudes outcome)

Weekly schedule & Weekly ILOs

Week	Topics	Weekly ILOs
1	Chemical Kinetics	ILO1, ILO8, ILO9
2	Chemical Equilibrium	ILO1, ILO8, ILO9
3	Acids and Bases	ILO2, ILO8, ILO9
4	Acid–Base Equilibria	ILO1, ILO2, ILO8, ILO9
5	Solubility and Complex Ion Equilibria	ILO1, ILO2, ILO8, ILO9
6	Mid-term Exam	ILO1, ILO2, ILO8, ILO9
7	Spontaneity, Entropy, and Free Energy	ILO1, ILO3, ILO8, ILO9
8	Experiment 1	ILO1, ILO2, ILO3, ILO8, ILO9
9	Electrochemistry	ILO4, ILO8, ILO9
10	The Representative Elements	ILO5, ILO8, ILO9
11	Experiment 2	ILO3, ILO4, ILO5, ILO8, ILO9
12	Transition Metals and Coordination Chemistry	ILO6, ILO8, ILO9
13	Organic and Biological Molecules	ILO7, ILO8, ILO9
14	Final Exam	ILO1, ILO2, ILO3, ILO4, ILO5, ILO6, ILO7, ILO8, ILO9

Assessment and Grading

This course will be assessed using criterion-referencing and grades will not be assigned using a curve. Detailed rubrics for each assignment are provided below, outlining the criteria used for evaluation.

Assessments:

Assessment Task	Contribution to Overall Course grade (%)
Assignments	20%
Mid-term Exam	20%
2 Lab Reports	20%
Final Exam	40%

Mapping of Course ILOs to Assessment Tasks

Assessed Task	Mapped ILOs	Explanation
Assignments	ILO1, ILO2, ILO3, ILO4, ILO5, ILO6, ILO7, ILO8, ILO9	This task assesses students' ability to explain and apply chemical concepts (ILO 1-7), evaluate their implications (ILO 1-7) and critically analyze their role in society (ILO 8-9).
Mid-term Exam	ILO1, ILO2, ILO8, ILO9	The mid-term exam assesses students' ability to explain and apply chemical concepts (ILO 1-2, 8-9).
2 Lab Reports	ILO1, ILO2, ILO3, ILO4, ILO5, ILO6, ILO8, ILO9	The lab reports assess students' ability to perform experiments and analyze data (ILO 1-6, 8-9).

Final Exam	ILO1, ILO2, ILO3, ILO4, ILO5, ILO6, ILO7, ILO8, ILO9	The final exam assesses students' ability to explain and apply chemical concepts (ILO 1-9).

Grading Rubrics & Final Grade Descriptors:

Grades	Short Description	Elaboration on subject grading description
A	Excellent Performance	Demonstrates a comprehensive grasp of subject matter, expertise in problem-solving, and significant creativity in thinking.
B	Good Performance	Shows good knowledge and understanding of the main subject matter, competence in problem-solving, and the ability to analyze and evaluate issues.
C	Satisfactory Performance	Possesses adequate knowledge of core subject matter, competence in dealing with familiar problems, and some capacity for analysis and critical thinking.
D	Marginal Pass	Has threshold knowledge of core subject matter, potential to achieve key professional skills, and the ability to make basic judgments. Benefits from the course and has the potential to develop in the discipline.
F	Fail	Demonstrates insufficient understanding of the subject matter and lacks the necessary problem-solving skills. Shows limited ability to think critically or analytically and exhibits minimal effort towards achieving learning goals. Does not meet the threshold requirements for professional practice or development in the discipline.

Course AI Policy

No AI allowed.

Communication and Feedback

Assessment marks for individual assessed tasks will be communicated via Canvas within two weeks of submission.

Resubmission Policy

Not applicable

Required Texts and Materials

Steven S. Zumdahl, Susan A. Zumdahl, Donald J. DeCoste **Chemistry: An Atoms First Approach** (3rd Edition) Standalone Looseleaf Version

Academic Integrity

Students are expected to adhere to the university's academic integrity policy. Students are expected to uphold HKUST(GZ)'s Academic Honor Code and to maintain the highest standards of academic integrity. The University has zero tolerance of academic misconduct. Please refer to Regulations for Academic Integrity and Student Conduct for the University's definition of plagiarism and ways to avoid cheating and plagiarism.