



UNSW Course Outline

ZPEM2113 Inorganic Chemistry and Spectroscopy - 2024

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General Course Information

Course Code : ZPEM2113

Year : 2024

Term : Semester 2

Teaching Period : Z2

Is a multi-term course? : No

Faculty : UNSW Canberra

Academic Unit : UC Science

Delivery Mode : In Person

Delivery Format : Standard

Delivery Location : UNSW Canberra at ADFA

Campus : UNSW Canberra

Study Level : Undergraduate

Units of Credit : 6

Useful Links

[Handbook Class Timetable](#)

Course Details & Outcomes

Course Description

This course introduces the compounds and chemistry of the transition metals, goes on to explain many of their unusual properties using different bonding theories. Stereochemistry, isomerism, spectroscopy and magnetic properties are studied, and the essential role played by

transition metals in biological and catalytic systems is highlighted. The environmental chemistry of different natural systems is also explored, highlighting the roles of different inorganic and organic compounds. Applications include water purification, water treatment, waste management, and air pollution.

Course Aims

On completion of the course the students will have gained a comprehensive understanding of the fundamentals of inorganic chemistry, especially the chemistry of transition metals. This includes the factors which determine structure and stability, and provide them with their unique behaviour. Students will also gain a fundamental grounding of the chemical behavior of compounds and elements in the environment. In particular water chemistry and water pollution, atmospheric chemistry, air pollution, and waste management

Relationship to Other Courses

This course shares laboratory timeslots with ZPEM2114 Biological Chemistry.

Course Learning Outcomes

| Course Learning Outcomes |
|--|
| CLO1 : Identify different types of isomerism in coordination complexes; and select/apply suitable laboratory methods for structure elucidation |
| CLO2 : Apply theory to explain physical and chemical properties of transition metal complexes, particularly the different bonding models |
| CLO3 : Understand basic principles of environmental chemistry, and obtain solutions to relevant problems and calculations. |
| CLO4 : Explain chemical characteristics of major processes and the interactions of contaminants in water, soil, and air systems. |

| Course Learning Outcomes | Assessment Item |
|--|---|
| CLO1 : Identify different types of isomerism in coordination complexes; and select/apply suitable laboratory methods for structure elucidation | <ul style="list-style-type: none">• Assignments• Laboratory• final exam |
| CLO2 : Apply theory to explain physical and chemical properties of transition metal complexes, particularly the different bonding models | <ul style="list-style-type: none">• Class tests various• Laboratory• final exam |
| CLO3 : Understand basic principles of environmental chemistry, and obtain solutions to relevant problems and calculations. | <ul style="list-style-type: none">• Class tests various• Laboratory• final exam |
| CLO4 : Explain chemical characteristics of major processes and the interactions of contaminants in water, soil, and air systems. | <ul style="list-style-type: none">• Class tests various• Laboratory• final exam |

Learning and Teaching Technologies

Moodle - Learning Management System

Learning and Teaching in this course

Lectures on theory are supplemented by tutorials, workshops and integrated laboratory or workshop exercises. These are designed to support and reinforce the concepts and methods under discussion and identify areas where additional study, or help, is required

Additional Course Information

Laboratory H&S regulations are outlined in the ZPEM2113 Laboratory Manual, which will be provided in lab class if needed. For safety information on specific chemicals, see the ChemAlert database at: <http://safety.unsw.edu.au>.

A Chemistry Laboratory Safety Induction is required before laboratory work can be commenced.

Assessments

Assessment Structure

| Assessment Item | Weight | Relevant Dates |
|---|--------|----------------------------------|
| Assignments Assessment Format: Individual Short Extension: Yes (3 days) | 10% | Due Date: 11/08/2024 11:59 PM |
| Class tests various Assessment Format: Individual | 30% | |
| Laboratory Assessment Format: Individual | 20% | |
| final exam Assessment Format: Individual | 40% | Due Date: Exam Period |

Assessment Details

Assignments

Assessment Overview

Not specified

Course Learning Outcomes

- CL01 : Identify different types of isomerism in coordination complexes; and select/apply suitable laboratory methods for structure elucidation

Detailed Assessment Description

Assignment on basic transition metal chemistry and structure elucidation.

Assignment submission Turnitin type

Not Applicable

Class tests various

Assessment Overview

Not specified

Course Learning Outcomes

- CL02 : Apply theory to explain physical and chemical properties of transition metal complexes, particularly the different bonding models
- CL03 : Understand basic principles of environmental chemistry, and obtain solutions to relevant problems and calculations.

- CL04 : Explain chemical characteristics of major processes and the interactions of contaminants in water, soil, and air systems.

Detailed Assessment Description

Class test 1 - TM chem bonding theories - Thu 22 Aug

Class test 2 - Environmental chemistry - Mon 21 Oct

Assignment submission Turnitin type

Not Applicable

Laboratory

Course Learning Outcomes

- CL01 : Identify different types of isomerism in coordination complexes; and select/apply suitable laboratory methods for structure elucidation
- CL02 : Apply theory to explain physical and chemical properties of transition metal complexes, particularly the different bonding models
- CL03 : Understand basic principles of environmental chemistry, and obtain solutions to relevant problems and calculations.
- CL04 : Explain chemical characteristics of major processes and the interactions of contaminants in water, soil, and air systems.

Detailed Assessment Description

Lab reports must be handed in during class time unless otherwise advised.

Assignment submission Turnitin type

Not Applicable

Hurdle rules

Attendance at laboratory classes is compulsory. Students must pass laboratory component in order to pass the course overall.

final exam

Assessment Overview

Not specified

Course Learning Outcomes

- CL01 : Identify different types of isomerism in coordination complexes; and select/apply suitable laboratory methods for structure elucidation
- CL02 : Apply theory to explain physical and chemical properties of transition metal complexes, particularly the different bonding models

- CLO3 : Understand basic principles of environmental chemistry, and obtain solutions to relevant problems and calculations.
- CLO4 : Explain chemical characteristics of major processes and the interactions of contaminants in water, soil, and air systems.

Detailed Assessment Description

Final exam covering whole course.

Assignment submission Turnitin type

Not Applicable

General Assessment Information

Grading Basis

Standard

Requirements to pass course

To pass this course you must obtain 50% overall mark, and also satisfy the requirements for the laboratory component.

Course Schedule

Attendance Requirements

Students are strongly encouraged to attend all classes and review lecture recordings.

Course Resources

Prescribed Resources

Resources such as reading materials and website links will be posted on the Moodle site for the course. The textbook for the second half of the course is "Environmental Chemistry", by Stanley E. Manahan.

Course Evaluation and Development

One of the key priorities in the 2025 Strategy for UNSW is a drive for academic excellence in education. One of the ways of determining how well UNSW is progressing towards this goal is by listening to our own students. Students will be asked to complete the myExperience survey towards the end of this course.

Students can also provide feedback during the semester via: direct contact with the lecturer, the "On-going Student Feedback" link in Moodle, Student-Staff Liaison Committee meetings in schools,

informal feedback conducted by staff, and focus groups. Student opinions really do make a difference. Refer to the Moodle site for this course to see how the feedback from previous students has contributed to the course development.

Staff Details

| Position | Name | Email | Location | Phone | Availability | Equitable Learning Services Contact | Primary Contact |
|----------|------------------------|-------|---------------------------------------|--------------|--|-------------------------------------|-----------------|
| Convenor | Lynne Wallace | | Room 213, Building 22 | 02 5114 5047 | Available by email or phone during standard office hours | No | Yes |
| Lecturer | Adrian Garrido Sanshis | | Room 218, Science North (Building 22) | 02 5114 5031 | Available by email or phone during standard office hours | No | No |