



## 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"><li>• Assignments</li><li>• Laboratory</li><li>• final exam</li></ul>
CLO2 : Apply theory to explain physical and chemical properties of transition metal complexes, particularly the different bonding models	<ul style="list-style-type: none"><li>• Class tests various</li><li>• Laboratory</li><li>• final exam</li></ul>
CLO3 : Understand basic principles of environmental chemistry, and obtain solutions to relevant problems and calculations.	<ul style="list-style-type: none"><li>• Class tests various</li><li>• Laboratory</li><li>• final exam</li></ul>
CLO4 : Explain chemical characteristics of major processes and the interactions of contaminants in water, soil, and air systems.	<ul style="list-style-type: none"><li>• Class tests various</li><li>• Laboratory</li><li>• final exam</li></ul>

## 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>.*

# 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

- CLO1 : 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

- 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.

#### **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**

- 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.

#### **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**

- 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.

#### **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