UNSW Course Outline

ZPEM3121 Supramolecular Chemistry - 2024

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General Course Information

Course Code : ZPEM3121
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 draws together concepts in inorganic, organic and some physical chemistry to study the behaviour and applications of supramolecular assemblies. Supramolecular Chemistry describes the chemistry of the interaction between discrete molecules and the collective

properties of this interaction. Many supramolecular structures are found in the biological machinery of the cell and a number of emerging technologies employ molecular building blocks in the set of chemical applications now called nanotechnology.

Course Aims

The aim of this course it to draw together concepts in inorganic, organic and some physical chemistry to study the behaviour and applications of supramolecular assemblies. Supramolecular chemistry describes the chemistry of large molecules, many of which are the building blocks of molecular systems employed in the set of chemical applications now called nanotechnology.

Relationship to Other Courses

This is a capstone 3rd year course, which draws together concepts in inorganic, organic and some physical chemistry to study the behaviour and applications of supramolecular assemblies.

The assumed knowledge for the course is the material taught in the level 1 and level 2 chemistry.

Course Learning Outcomes

Course Learning Outcomes
CLO1 : Students will demonstrate that they recognise the types and forms of molecular components required to react together to form supramolecular structures.
CLO2 : Students will show they understand the chemical forces involved in the formation of supramolecular structures.
CLO3 : Students will demonstrate the ability to recognise a formed supramolecular structure, based upon an understanding of the geometrical features of the component molecules and the chemical forces that are involved in the formation of such structures.
CLO4 : Students will demonstrate an understanding of the common techniques for identification and characterisation of supramolecular structures.

Course Learning Outcomes	Assessment Item
CLO1 : Students will demonstrate that they recognise the types and forms of molecular components required to react together to form supramolecular structures.	• Theory Class Tests and Assignment • Laboratory prac sessions • Theory Final Exam
CLO2 : Students will show they understand the chemical forces involved in the formation of supramolecular structures.	• Theory Class Tests and Assignment • Laboratory prac sessions • Theory Final Exam
CLO3 : Students will demonstrate the ability to recognise a formed supramolecular structure, based upon an understanding of the geometrical features of the component molecules and the chemical forces that are involved in the formation of such structures.	• Theory Class Tests and Assignment • Laboratory prac sessions • Theory Final Exam
CLO4 : Students will demonstrate an understanding of the common techniques for identification and characterisation of supramolecular structures.	• Laboratory prac sessions

Learning and Teaching Technologies

Moodle - Learning Management System

Learning and Teaching in this course

Enrolment in this course or participation in any activity that is recorded constitutes consent to be recorded during tutorial and other teaching sessions. Recordings will only be used for the purposes of teaching this

course. If you do not consent to be recorded, you must notify your course convenor immediately so other arrangements can be made.

The course material will be presented as lectures interspersed with tutorials.

Additional Course Information

The course material will be presented as lectures interspersed with tutorials. A hands-on understanding of supramolecular chemistry will be achieved through completing two mini research projects as laboratory exercisers.

Assessments

Assessment Structure

Assessment Item	Weight	Relevant Dates
Theory Class Tests and Assignment	30%	Start Date: 16/09/2024 12:00 AM Due Date: 2 weeks
Laboratory prac sessions Short Extension: Yes (7 days)	30%	Start Date: Not Applicable Due Date: 2 weeks
Theory Final Exam	40%	Start Date: Not Applicable Due Date: Not Applicable

Assessment Details

Theory Class Tests and Assignment

Course Learning Outcomes

- CLO1 : Students will demonstrate that they recognise the types and forms of molecular components required to react together to form supramolecular structures.
- CLO2 : Students will show they understand the chemical forces involved in the formation of supramolecular structures.
- CLO3 : Students will demonstrate the ability to recognise a formed supramolecular structure, based upon an understanding of the geometrical features of the component molecules and the chemical forces that are involved in the formation of such structures.

Detailed Assessment Description

There will be two class tests (each 10%) and an assignment (10%).

The first test (week 6) will be at the conclusion of the lectures for the organic portion (Part A).

The second test (week 13) will be at the conclusion of the lectures for the inorganic portion (Part B)

The assignment (10%) will be issued in week 9, due in week 10.

Assessment Length

concise

Submission notes

N/A

Assignment submission Turnitin type

Not Applicable

Laboratory prac sessions

Course Learning Outcomes

- CLO1 : Students will demonstrate that they recognise the types and forms of molecular components required to react together to form supramolecular structures.
- CLO2 : Students will show they understand the chemical forces involved in the formation of supramolecular structures.
- CLO3 : Students will demonstrate the ability to recognise a formed supramolecular structure, based upon an understanding of the geometrical features of the component molecules and the chemical forces that are involved in the formation of such structures.
- CLO4 : Students will demonstrate an understanding of the common techniques for identification and characterisation of supramolecular structures.

Detailed Assessment Description

Part A and B of the course will have laboratory exercises that are project based with two projects in total. Each lab project wirite up assessment is 15%.

All assessable project work must be submitted no later than two weeks after the exercise period is completed.

Assessment Length

concise and less than 10,000 words

Submission notes

In the form of a chemistry journal research paper

Assessment information

Lab writting instruction will be on Moodle

Assignment submission Turnitin type

Not Applicable

Theory Final Exam

Course Learning Outcomes

- CLO1 : Students will demonstrate that they recognise the types and forms of molecular components required to react together to form supramolecular structures.
- CLO2 : Students will show they understand the chemical forces involved in the formation of supramolecular structures.
- CLO3 : Students will demonstrate the ability to recognise a formed supramolecular structure, based upon an understanding of the geometrical features of the component molecules and the chemical forces that are involved in the formation of such structures.

Detailed Assessment Description

The exam covers the content of the entire course.

Assessment Length

specific to the exam questions

Submission notes

exam pperiod

Assignment submission Turnitin type

Not Applicable

General Assessment Information

The projects are to be written in the format of a scientific article with appropriate analysis and referencing. A guideline will be provided on Moodle.

Grading Basis

Standard

Requirements to pass course

Both the theory and laboratory components of this course are considered essential. Consequently, where a student passes the theory component but not the laboratory component and the total composite mark is greater than 46%, a grade of UF (unsatisfactory performance in an essential component of the course) will apply, even if the final mark is 50% or higher. Similarly where the laboratory component is passed, but not the theory component, again a grade of UF will be recorded where the total composite mark is greater than 46%. Below 46%, in both cases, a fail grade will be recorded.

The overall passing mark is set at 50% by the university and this will not be varied. All

assessment components over the course must be completed satisfactorily. All marks obtained for assessment items during the session are provisional. The final mark as published by the university following the assessment review group meeting, is the only official mark.

Course Schedule

Teaching Week/Module	Activity Type	Content
Week 1 : 15 July - 19 July	Lecture	Introduction to supramolecular chemistry from an organic perspective (Part A) - the basic principles of supramolecular chemistry will be presented and discussed.
Week 3 : 29 July - 2 August	Lecture	Methods for the identification - of supramolecular structures with be presented and discussed
Week 4 : 5 August - 9 August	Laboratory	The lab for the part A projects begins in this week which continues in weeks 6 and 7 to complete the first project for Part A of the course.
Week 6 : 19 August - 23 August	Lecture	Apllications of supramolecular
	Laboratory	Second lab for the continuation of your project.
	Assessment	A test (23rd Aug) covering Part A of the course
Week 7 : 9 September - 13 September	Lecture	Part B A introduction to an inorganic perspective of supramolecular chemistry
	Laboratory	The final lab period to complete the Part A project.
Week 8 : 16 September - 20 September	Laboratory	Part B lab project begins
Week 9 : 23 September - 27 September	Lecture	Analytical methods - electrochemistry and electronic spectroscopy
Week 10 : 30 September - 4 October	Assessment	Assignment due (30th Sept)
	Laboratory	
	Lecture	Anion binding
Week 12 : 14 October - 18 October	Assessment	A test (21st Oct) covering Part B of the course
	Laboratory	The final lab period to complete the Part B project.

Attendance Requirements

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

General Schedule Information

Students are advised to attend all face to face lectures and consult the echo 360 when they miss a lecture or require a refresher of the material.

Attendance and participation in laboratory classes is a required component to the course.

Course Resources

Prescribed Resources

§ Steed J. W. and Atwood J. L. Supramolecular Chemistry, John Wiley and Son, 2007, 2nd Ed. ISBN 978-0-470-51234-0.

Recommended Resources

Other useful reference material:

- J.W. Steed and P.A. Gale (eds). SupramolecularChemistry from molecules to nanomaterials, Vol 1-8 (2012) John Wiley & Sons Ltd, Chichester, UK,
- Cucurbiturils and Related Macrocycles, K. Kim (ed). (2020) Royal Society of Chemistry, UK,

Lecturers may suggest relevant reading material during the delivery of the course. Other teaching materials or tutorial aids, will also be posted on the Moodle website.

Additional Costs

none

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	Anthony Day		B22 Rm 220	+61 2 5114 5041	during working hours (appointment by email)	No	Yes