CHEM3202

Advanced Analysis and Measurement

Session 1, In person-scheduled-weekday, North Ryde 2024

School of Natural Sciences

Contents

General Information

Unit convenor and teaching staff
Alf Garcia-Bennett
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Credit points
10

Prerequisites
CHEM2201 or CBMS200 or CBMS208

Corequisites

Co-badged status
CHEM6231

Unit description
This unit covers advanced aspects of chemical analysis, building on the foundations laid in Analysis and Measurement. Modern chemical principles and practice of identifying substances and of determining their composition are discussed. Topics include many analytical techniques commonly employed in both industrial and academic research laboratories. The unit emphasises hands-on experience in analysing real life samples, using a wide range of techniques from a chemical, structural and physical perspective.

Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are available at https://www.mq.edu.au/study/calendar-of-dates

Learning Outcomes

On successful completion of this unit, you will be able to:

ULO1: Demonstrate an understanding of the concepts of molecular analysis and measurement in the molecular sciences.

ULO2: Demonstrate competency in the selection and use of important analytical techniques commonly used in industrial and academic research.

ULO3: Communicate effectively within the conventions of the analytical molecular sciences discipline.

ULO4: Process and analyse chemical experimental data to draw scientifically sound conclusions, particularly the significance and validity of analytical results involving real-

life samples.

ULO5: Communicate analytical chemical knowledge by appropriately documenting the essential details of procedures undertaken, key observations, results and conclusions.

General Assessment Information

- Requirements to Pass this Unit

To pass this unit you must achieve a total mark equal to or greater than 50%. There are no hurdle assesments in this unit.

- Late Assessment Submission Penalty

Unless a Special Consideration request has been submitted and approved, a 5% penalty (of the total possible mark of the task) will be applied for each day a written report or presentation assessment is not submitted, up until the 7th day (including weekends). After the 7th day, a grade of '0' will be awarded even if the assessment is submitted. The submission time for all uploaded assessments is 11:55 pm. A 1-hour grace period will be provided to students who experience a technical concern.

For any late submission of time-sensitive tasks, such as the problem sets, and/or scheduled practical assessments/labs, please apply for Special Consideration.

- Special Considerations

The Special Consideration Policy aims to support students who have been impacted by short-term circumstances or events that are serious, unavoidable and significantly disruptive, and which may affect their performance in assessment. If you experience circumstances or events that affect your ability to complete the assessments in this unit on time, please inform the convenor and submit a Special Consideration request through ask.mq.edu.au.

Laboratory

Assessment Type [1]: Lab report Indicative Time on Task [2]: 30 hours Due: **Week 2-Week 13** Weighting: **30%**

For each experiment, students are required to complete some Pre-laboratory work including Materials Safety Data Sheets and the general understanding of aim and procedure of the experiment. Following the completion of a laboratory session, students will then complete a written report.

On successful completion you will be able to:

- Demonstrate an understanding of the concepts of molecular analysis and measurement in the molecular sciences.
- Demonstrate competency in the selection and use of important analytical techniques

commonly used in industrial and academic research.
- Communicate effectively within the conventions of the analytical molecular sciences discipline.
- Process and analyse chemical experimental data to draw scientifically sound conclusions, particularly the significance and validity of analytical results involving real-life samples.
- Communicate analytical chemical knowledge by appropriately documenting the essential details of procedures undertaken, key observations, results and conclusions.

Assignment 1

Assessment Type [1]: Problem set Indicative Time on Task [2]: 15 hours Due: **21/04/2023**
Weighting: **10%**

Qualitative and quantitative questions requiring processing and critically analysis.

On successful completion you will be able to:

- Demonstrate an understanding of the concepts of molecular analysis and measurement in the molecular sciences.
- Communicate effectively within the conventions of the analytical molecular sciences discipline.
- Process and analyse chemical experimental data to draw scientifically sound conclusions, particularly the significance and validity of analytical results involving real-life samples.

Assignment 2

Assessment Type [1]: Problem set Indicative Time on Task [2]: 15 hours Due: **02/06/2023**
Weighting: **10%**

Qualitative and quantitative questions requiring processing and critically analysis.

On successful completion you will be able to:

- Demonstrate an understanding of the concepts of molecular analysis and measurement in the molecular sciences.
- Communicate effectively within the conventions of the analytical molecular sciences discipline.

- Process and analyse chemical experimental data to draw scientifically sound conclusions, particularly the significance and validity of analytical results involving real-life samples.
- Communicate analytical chemical knowledge by appropriately documenting the essential details of procedures undertaken, key observations, results and conclusions.

Final Examination

Assessment Type [1]: Examination Indicative Time on Task [2]: 35 hours Due: **Week 14**
Weighting: **50%**

Closed book examination.

On successful completion you will be able to:

- Demonstrate an understanding of the concepts of molecular analysis and measurement in the molecular sciences.
- Communicate effectively within the conventions of the analytical molecular sciences discipline.
- Process and analyse chemical experimental data to draw scientifically sound conclusions, particularly the significance and validity of analytical results involving real-life samples.
- Communicate analytical chemical knowledge by appropriately documenting the essential details of procedures undertaken, key observations, results and conclusions.

[1] If you need help with your assignment, please contact:

- the academic teaching staff in your unit for guidance in understanding or completing this type of assessment
- the Writing Centre for academic skills support.

[2] Indicative time-on-task is an estimate of the time required for completion of the assessment task and is subject to individual variation

Assessment Tasks

Name	Weighting	Hurdle	Due
Assignment 1	10%	No	Week 6

Name	Weighting	Hurdle	Due
Assignment 2	10%	No	Week 12
Laboratory	30%	No	Week 2-12
Final Examination	50%	No	Week 13

Assignment 1

Assessment Type [1]: Problem set
Indicative Time on Task [2]: 15 hours
Due: **Week 6**
Weighting: **10%**

Qualitative and quantitative questions requiring processing and critically analysis.

On successful completion you will be able to:

- Demonstrate an understanding of the concepts of molecular analysis and measurement in the molecular sciences.
- Communicate effectively within the conventions of the analytical molecular sciences discipline.
- Process and analyse chemical experimental data to draw scientifically sound conclusions, particularly the significance and validity of analytical results involving real-life samples.

Assignment 2

Assessment Type [1]: Problem set
Indicative Time on Task [2]: 15 hours
Due: **Week 12**
Weighting: **10%**

Qualitative and quantitative questions requiring processing and critically analysis.

On successful completion you will be able to:

- Demonstrate an understanding of the concepts of molecular analysis and measurement in the molecular sciences.

- Communicate effectively within the conventions of the analytical molecular sciences discipline.
- Process and analyse chemical experimental data to draw scientifically sound conclusions, particularly the significance and validity of analytical results involving real-life samples.
- Communicate analytical chemical knowledge by appropriately documenting the essential details of procedures undertaken, key observations, results and conclusions.

Laboratory

Assessment Type [1]: Lab report
Indicative Time on Task [2]: 30 hours
Due: **Week 2-12**
Weighting: **30%**

For each experiment, students are required to complete some Pre-laboratory work including Materials Safety Data Sheets and the general understanding of aim and procedure of the experiment. Following the completion of a laboratory session, students will then complete a written report.

On successful completion you will be able to:

- Demonstrate an understanding of the concepts of molecular analysis and measurement in the molecular sciences.
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- Communicate analytical chemical knowledge by appropriately documenting the essential details of procedures undertaken, key observations, results and conclusions.

Final Examination

Assessment Type [1]: Examination
Indicative Time on Task [2]: 35 hours
Due: **Week 13**
Weighting: **50%**

Closed book examination.

On successful completion you will be able to:

- Demonstrate an understanding of the concepts of molecular analysis and measurement in the molecular sciences.
- Communicate effectively within the conventions of the analytical molecular sciences discipline.
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Delivery and Resources

This unit requres150 hours of work over the semester (formal contact hours and self study time). This is an average of 10 hours of work per week over each of the 15 weeks of semester. For students with weaker chemistry backgrounds, more time per week will likely be needed to perform satisfactorily in this unit. Formal contact hours for Analytical Chemistry and Measurement consist of 2 hours of lectures and a 1-hour interactive SGTA per week, along with 5 x 4-hour laboratory classes throughout semester. Students are expected to participate in all lectures, SGTAs and laboratory classes. Active participation by students in all of these activities will be essential for success in the unit.

Lectures

The unit will cover 2 hours of lecture material each week starting on Week 1. This will consist of a mixture of pre-recorded lectures (uploaded prior to the lecture) and interactive (live) lectures. Some lecture material will be available on the unit web site, while other material will be provided during the lecture classes. You should use these lectures as a starting point and supplement their content with material from the text book, the scientific literature and from other online

sources. Much of the unit content builds on content covered in previous weeks, so it will be essential to keep up to date with the lecture material throughout the semester.

Interactive Classes (SGTAs)

A 1-hour interactive classes (SGTA) will be held each week. This is your opportunity to interact directly with the teaching staff, to ask lots of pertinent questions and to identify any weaknesses or clarify misconceptions you may have. Learning is an active process, and as such, you must engage with the material. This means reading the textbook (and beyond) before and after lectures, attempting the assignment questions and discussing the concepts with your classmates and lecturers. Do not be afraid to ask questions – everyone benefits from a robust and open discussion of the topics.

Problem Sets

There will be two sets of open book problems/exercises that will be issued towards the mid-semester break and towards the end of the semester. They are designed to challenge your learning and revise the material covered in prior weeks. You will be given suffient time to cover these exercises (typically 7-10 days).

Laboratory Classes

Laboratory classes will be conducted in small teams and require a highly collaborative and investigative approach. You will be designing and synthesising a series of sulfonamide antibiotics and subsequently testing them for antibacterial activity to determine the important features for their antibacterial activity. This laboratory work is designed to give real-world experience in research by involving you in the design of the experiments, using literature procedures as a guide, and troubleshooting to identify the best experimental conditions. The classes will emphasise the importance of teamwork and being well prepared and efficient. You will need to be fully aware of safety procedures, proper recording and reporting of raw data and interpretation of results. This will require an analytical and inquisitive approach. There will be 5 wet labs sessions run in two streams (Group A and Group B) on alternating weeks, starting in Weeks 2/3. To maximise the amount of wet lab time available to complete the experiments, you will need to be highly organised and to have prepared thoroughly BEFORE entering the laboratory which includes the Risk Assesments included in the pre-lab. If you are not able to "hit the ground running" each laboratory class, you will almost certainly run out of time by the end of semester.

Methods of Communication

We will communicate with you via your university email or through announcements on iLearn. Queries to convenors can either be placed on the iLearn discussion board or sent to the convernor directly from your university email address.

COVID Information

For the latest information on the University’s response to COVID-19, please refer to the Coronavirus infection page on the Macquarie website: https://www.mq.edu.au/about/coronavirus-faqs.

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central (https://policies.mq.edu.au). Students should be aware of the following policies in particular with regard to Learning and Teaching:

- Academic Appeals Policy
- Academic Integrity Policy
- Academic Progression Policy
- Assessment Policy
- Fitness to Practice Procedure
- Assessment Procedure
- Complaints Resolution Procedure for Students and Members of the Public
- Special Consideration Policy

Students seeking more policy resources can visit Student Policies (https://students.mq.edu.au/support/study/policies). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

To find other policies relating to Teaching and Learning, visit Policy Central (https://policies.mq.edu.au) and use the search tool.

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: https://students.mq.edu.au/admin/other-resources/student-conduct

Results

Results published on platform other than eStudent, (eg. iLearn, Coursera etc.) or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in eStudent. For more information visit ask.mq.edu.au or if you are a Global MBA student contact globalmba.support@mq.edu.au

Academic Integrity

At Macquarie, we believe academic integrity – honesty, respect, trust, responsibility, fairness and courage – is at the core of learning, teaching and research. We recognise that meeting the expectations required to complete your assessments can be challenging. So, we offer you a range of resources and services to help you reach your potential, including free online writing and maths support, academic skills development and wellbeing consultations.

Student Support

Macquarie University provides a range of support services for students. For details, visit http://students.mq.edu.au/support/

The Writing Centre

The Writing Centre provides resources to develop your English language proficiency, academic writing, and communication skills.

- Workshops
- Chat with a WriteWISE peer writing leader
- Access StudyWISE
- Upload an assignment to Studiosity
- Complete the Academic Integrity Module

The Library provides online and face to face support to help you find and use relevant information resources.

- Subject and Research Guides
- Ask a Librarian

Student Services and Support

Macquarie University offers a range of Student Support Services including:

- IT Support
- Accessibility and disability support with study
- Mental health support
- Safety support to respond to bullying, harassment, sexual harassment and sexual assault
- Social support including information about finances, tenancy and legal issues
- Student Advocacy provides independent advice on MQ policies, procedures, and processes

Student Enquiries

Got a question? Ask us via AskMQ, or contact Service Connect.

IT Help

For help with University computer systems and technology, visit http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/.

When using the University's IT, you must adhere to the Acceptable Use of IT Resources Policy. The policy applies to all who connect to the MQ network including students.

Unit information based on version 2024.01R of the Handbook