



CBMS825

Chemical Analysis II

S1 Day 2017

Dept of Chemistry & Biomolecular Sciences

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General Information

Unit convenor and teaching staff

Unit Convenor

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Laboratory Demonstrator

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Laboratory Demonstrator

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Laboratory Demonstrator

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Credit points

4

Prerequisites

Admission to MLabQAMgt or MRadiopharmSc or MSc or MBiotech or MBioBus and permission by special approval

Corequisites

Co-badged status

CBMS308

Unit description

This unit discusses the chemical principles and practice of both qualitative and quantitative determination of sample identifying and determining the composition. 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. A proportion of the unit develops skills in the use of modern library resources and electronic information retrieval. Using these skills, students will complete a short research project addressing a real-life analytical chemistry problem.

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:

To display competency in the use of important analytical techniques commonly used in industrial and academic research

To analyse and interpret experimental data and present them in a structured report utilising appropriate scientific referencing

To analyse and critique experimental data and present them in oral format

To process and analyse chemical experimental data to draw scientifically sound conclusions, particularly the significance and validity of analytical results involving real-life samples

To deliver an oral presentation on a selected topic in analytical chemistry

To build teamwork with other members of the unit by working together in a laboratory environment

General Assessment Information

In addition to hardcopies, all assignments and laboratory reports must be electronically submitted through turnitin. A permanent record of all these items must also be kept on iLearn.

Assessment Tasks

Name	Weighting	Hurdle	Due
<u>Assignment 1</u>	4%	No	31/03/2017
<u>Assignment 2</u>	3%	No	01/05/2017
<u>Assignment 3</u>	3%	No	26/05/2017
<u>Mid-Year 3-hour Examination</u>	50%	No	June 2017
<u>Laboratory Work</u>	40%	No	Every two weeks + Week 12

Assignment 1

Due: **31/03/2017**

Weighting: **4%**

Numerical calculations and short answers.

On successful completion you will be able to:

- To display competency in the use of important analytical techniques commonly used in industrial and academic research
- To analyse and interpret experimental data and present them in a structured report utilising appropriate scientific referencing
- To analyse and critique experimental data and present them in oral format
- To 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

Due: **01/05/2017**

Weighting: **3%**

Numerical calculations and short answers.

On successful completion you will be able to:

- To display competency in the use of important analytical techniques commonly used in industrial and academic research
- To analyse and interpret experimental data and present them in a structured report utilising appropriate scientific referencing
- To analyse and critique experimental data and present them in oral format
- To process and analyse chemical experimental data to draw scientifically sound conclusions, particularly the significance and validity of analytical results involving real-life samples

Assignment 3

Due: **26/05/2017**

Weighting: **3%**

Numerical calculations and short answers.

On successful completion you will be able to:

- To display competency in the use of important analytical techniques commonly used in industrial and academic research
- To analyse and interpret experimental data and present them in a structured report utilising appropriate scientific referencing
- To analyse and critique experimental data and present them in oral format

- To process and analyse chemical experimental data to draw scientifically sound conclusions, particularly the significance and validity of analytical results involving real-life samples

Mid-Year 3-hour Examination

Due: **June 2017**

Weighting: **50%**

Closed book examination.

On successful completion you will be able to:

- To display competency in the use of important analytical techniques commonly used in industrial and academic research
- To analyse and interpret experimental data and present them in a structured report utilising appropriate scientific referencing
- To analyse and critique experimental data and present them in oral format

Laboratory Work

Due: **Every two weeks + Week 12**

Weighting: **40%**

This component consists of 5 laboratory experiments and 1 project.

For each experiment, students are required to complete some Pre-laboratory work including Materials Safety Data Sheets and an oral assessment of the general understanding of aim and procedure of the experiment. Following the completion of a laboratory session, students will then decide on either completing a written report or performing an oral assessment on the laboratory work. Students must complete a total of 3 written reports and 2 oral assessments.

Of the 40% for this component, 65% of the assessment will be weighted for laboratory work, and 35% weighted for a project. Each student is required to submit a report and also to deliver a verbal presentation for the project.

On successful completion you will be able to:

- To display competency in the use of important analytical techniques commonly used in industrial and academic research
- To analyse and interpret experimental data and present them in a structured report utilising appropriate scientific referencing
- To analyse and critique experimental data and present them in oral format

- To process and analyse chemical experimental data to draw scientifically sound conclusions, particularly the significance and validity of analytical results involving real-life samples
- To deliver an oral presentation on a selected topic in analytical chemistry
- To build teamwork with other members of the unit by working together in a laboratory environment

Delivery and Resources

Prescribed text

D.C.Harris, Quantitative Chemical Analysis, 9th Edition, W.H.Freeman and Company (2016).

Recommended references

D.A.Skoog, D.M.West, F.J.Holler, S.R.Crouch, Fundamentals of Analytical Chemistry, 9th Edition, Brooks/Cole, Thomson Learning, Inc (2014).

D.A.Skoog, F.J.Holler and S.R.Crouch, Principles of Instrumental Analysis, 7th Edition, Saunders College Publishing (2018).

Unit Schedule

Date	Time	Activity
February 27	9:00 – 10:30	Outline of Unit
		Calibration Methods
	11:00 – 1:00	Voltammetry
	2:00 – 4:00	Information Retrieval
	4:00 – 6:00	Scientific Report Writing
March 6	9:00 – 1:00	Laboratory Session
	2:00 – 3:30	Voltammetry
	4:00 – 5:30	Voltammetry

	Tutorial Set 1 on Voltammetry	
	Assignment 1 due at 6 pm, March 31, 2017	
March 13	9:00 – 1:00	Laboratory Session
	2:00 – 3:30	Voltammetry
	4:00 – 5:30	Voltammetry
March 20	9:00 – 1:00	Laboratory Session
	2:00 – 3:30	Atomic Spectroscopy
	4:00 – 5:30	Atomic Spectroscopy
	Tutorial Set 2 on Atomic Spectroscopy	
March 27	9:00 – 1:00	Laboratory Session
	2:00 – 3:30	Electrophoresis
	4:00 – 5:30	Electrophoresis
	Tutorial Set 3 on Electrophoresis	
April 3	9:00 – 1:00	Laboratory Session
	2:00 – 3:30	Mass Spectroscopy
	4:00 – 5:30	Mass Spectroscopy
	Assignment 2 due at 6 pm, May 1, 2017	
April 10	9:00 – 1:00	Laboratory Session

	2:00 – 3:30	Mass Spectroscopy
	4:00 – 5:30	Microbeam and Surface Analysis
	Tutorial Set 4 Mass Spectroscopy	
May 1	9:00 – 1:00	Laboratory Session
	2:00 – 3:30	Microbeam and Surface Analysis
	4:00 – 5:30	Microbeam and Surface Analysis
	Tutorial Set 4 on Microbeam and Surface Analysis	
	Assignment 3 due at 6 pm, May 26, 2017	
June 5	9:00 – 10:30	Sensing Technologies
	11:00 – 12:30	Sensing Technologies
	Tutorial Set 5 on Sensing Technologies	
	1:30 – 5:30	Presentation of project work (CBMS825)

Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central](#). Students should be aware of the following policies in particular with regard to Learning and Teaching:

Academic Honesty Policy http://mq.edu.au/policy/docs/academic_honesty/policy.html

Assessment Policy http://mq.edu.au/policy/docs/assessment/policy_2016.html

Grade Appeal Policy <http://mq.edu.au/policy/docs/gradeappeal/policy.html>

Complaint Management Procedure for Students and Members of the Public http://www.mq.edu.au/policy/docs/complaint_management/procedure.html

Disruption to Studies Policy (in effect until Dec 4th, 2017): http://www.mq.edu.au/policy/docs/disruption_studies/policy.html

Special Consideration Policy (in effect from Dec 4th, 2017): <https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policies/special-consideration>

In addition, a number of other policies can be found in the [Learning and Teaching Category](#) of Policy Central.

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: https://students.mq.edu.au/support/student_conduct/

Results

Results shown in *iLearn*, 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.

Student Support

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

Learning Skills

Learning Skills (mq.edu.au/learningskills) provides academic writing resources and study strategies to improve your marks and take control of your study.

- [Workshops](#)
- [StudyWise](#)
- [Academic Integrity Module for Students](#)
- [Ask a Learning Adviser](#)

Student Services and Support

Students with a disability are encouraged to contact the [Disability Service](#) who can provide appropriate help with any issues that arise during their studies.

Student Enquiries

For all student enquiries, visit Student Connect at ask.mq.edu.au

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.

Graduate Capabilities

PG - Capable of Professional and Personal Judgment and Initiative

Our postgraduates will demonstrate a high standard of discernment and common sense in their professional and personal judgment. They will have the ability to make informed choices and decisions that reflect both the nature of their professional work and their personal perspectives.

This graduate capability is supported by:

Learning outcomes

- To display competency in the use of important analytical techniques commonly used in industrial and academic research
- To analyse and interpret experimental data and present them in a structured report utilising appropriate scientific referencing
- To analyse and critique experimental data and present them in oral format
- To process and analyse chemical experimental data to draw scientifically sound conclusions, particularly the significance and validity of analytical results involving real-life samples
- To deliver an oral presentation on a selected topic in analytical chemistry
- To build teamwork with other members of the unit by working together in a laboratory environment

Assessment tasks

- Assignment 1
- Assignment 2
- Assignment 3
- Mid-Year 3-hour Examination
- Laboratory Work

PG - Discipline Knowledge and Skills

Our postgraduates will be able to demonstrate a significantly enhanced depth and breadth of knowledge, scholarly understanding, and specific subject content knowledge in their chosen fields.

This graduate capability is supported by:

Learning outcomes

- To display competency in the use of important analytical techniques commonly used in industrial and academic research

- To analyse and interpret experimental data and present them in a structured report utilising appropriate scientific referencing
- To analyse and critique experimental data and present them in oral format
- To process and analyse chemical experimental data to draw scientifically sound conclusions, particularly the significance and validity of analytical results involving real-life samples
- To deliver an oral presentation on a selected topic in analytical chemistry

Assessment tasks

- Assignment 1
- Assignment 2
- Assignment 3
- Mid-Year 3-hour Examination
- Laboratory Work

PG - Critical, Analytical and Integrative Thinking

Our postgraduates will be capable of utilising and reflecting on prior knowledge and experience, of applying higher level critical thinking skills, and of integrating and synthesising learning and knowledge from a range of sources and environments. A characteristic of this form of thinking is the generation of new, professionally oriented knowledge through personal or group-based critique of practice and theory.

This graduate capability is supported by:

Learning outcomes

- To display competency in the use of important analytical techniques commonly used in industrial and academic research
- To analyse and interpret experimental data and present them in a structured report utilising appropriate scientific referencing
- To analyse and critique experimental data and present them in oral format
- To process and analyse chemical experimental data to draw scientifically sound conclusions, particularly the significance and validity of analytical results involving real-life samples
- To deliver an oral presentation on a selected topic in analytical chemistry

Assessment tasks

- Assignment 1
- Assignment 2
- Assignment 3

- Mid-Year 3-hour Examination
- Laboratory Work

PG - Research and Problem Solving Capability

Our postgraduates will be capable of systematic enquiry; able to use research skills to create new knowledge that can be applied to real world issues, or contribute to a field of study or practice to enhance society. They will be capable of creative questioning, problem finding and problem solving.

This graduate capability is supported by:

Learning outcomes

- To display competency in the use of important analytical techniques commonly used in industrial and academic research
- To analyse and interpret experimental data and present them in a structured report utilising appropriate scientific referencing
- To analyse and critique experimental data and present them in oral format
- To process and analyse chemical experimental data to draw scientifically sound conclusions, particularly the significance and validity of analytical results involving real-life samples
- To deliver an oral presentation on a selected topic in analytical chemistry

Assessment tasks

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- Assignment 2
- Assignment 3
- Mid-Year 3-hour Examination
- Laboratory Work

PG - Effective Communication

Our postgraduates will be able to communicate effectively and convey their views to different social, cultural, and professional audiences. They will be able to use a variety of technologically supported media to communicate with empathy using a range of written, spoken or visual formats.

This graduate capability is supported by:

Learning outcomes

- To display competency in the use of important analytical techniques commonly used in industrial and academic research
- To analyse and interpret experimental data and present them in a structured report

utilising appropriate scientific referencing

- To analyse and critique experimental data and present them in oral format
- To process and analyse chemical experimental data to draw scientifically sound conclusions, particularly the significance and validity of analytical results involving real-life samples
- To deliver an oral presentation on a selected topic in analytical chemistry
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Assessment tasks

- Assignment 1
- Assignment 2
- Assignment 3
- Mid-Year 3-hour Examination
- Laboratory Work

PG - Engaged and Responsible, Active and Ethical Citizens

Our postgraduates will be ethically aware and capable of confident transformative action in relation to their professional responsibilities and the wider community. They will have a sense of connectedness with others and country and have a sense of mutual obligation. They will be able to appreciate the impact of their professional roles for social justice and inclusion related to national and global issues

This graduate capability is supported by:

Learning outcomes

- To display competency in the use of important analytical techniques commonly used in industrial and academic research
- To analyse and interpret experimental data and present them in a structured report utilising appropriate scientific referencing
- To analyse and critique experimental data and present them in oral format
- To process and analyse chemical experimental data to draw scientifically sound conclusions, particularly the significance and validity of analytical results involving real-life samples
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Assessment tasks

- Assignment 1
- Assignment 2
- Assignment 3
- Mid-Year 3-hour Examination
- Laboratory Work

Changes since last offering

Technology Used

It is important that you have a scientific calculator as hand-held calculators will be used during laboratory sessions, for assignments,

and in the final examination. Note that text retrieval calculators are not allowed in the final examination.

Use will be made of Excel and other data processing and display software. Computers carrying this software are available in the teaching laboratories. Items of interest, links to other on-line material will be placed on the unitwebsite.

Computers for general use are provided by the University, but it would be advantageous to have your own computer and internet access.