



# CBMS825

## Chemical Analysis II

S1 Day 2015

*Dept of Chemistry & Biomolecular Sciences*

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## General Information

Unit convenor and teaching staff

Lecturer

Christopher McRae

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Contact via [christopher.mcrae@mq.edu.au](mailto:christopher.mcrae@mq.edu.au)

F7B 328

Students are encouraged to arrange a meeting via email.

Unit Convenor

Danny Wong

[danny.wong@mq.edu.au](mailto:danny.wong@mq.edu.au)

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F7B 235

Credit points

4

Prerequisites

Admission to MLabQAMgt or PGDipLabQAMgt or PGCertLabQAMgt or GradCertLabQAMgt or GradDipLabQAMgt or MRadiopharmSc or MSc or MBiotech or MBioBus

Corequisites

Co-badged status

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 acquire the principles of a range of advanced analytical techniques commonly used in industrial and academic research

To be able to make a selection of an appropriate analytical technique or a combination of techniques for the analysis of targeted samples, based on the chemistry involved

To interpret and draw sound conclusions from analytical chemical data obtained

To prepare written scientific documents at a satisfactory level

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

## Assessment Tasks

Name	Weighting	Due
<u>Assignments</u>	10%	March 27; April 24; May 29
<u>Laboratory Work</u>	40%	Every two weeks + Week 12
<u>Mid-Year 3-hour Examination</u>	50%	June 2015

### Assignments

Due: **March 27; April 24; May 29**

Weighting: **10%**

Numerical calculations and short answers.

On successful completion you will be able to:

- To acquire the principles of a range of advanced analytical techniques commonly used in industrial and academic research
- To be able to make a selection of an appropriate analytical technique or a combination of techniques for the analysis of targeted samples, based on the chemistry involved
- To interpret and draw sound conclusions from analytical chemical data obtained
- To prepare written scientific documents at a satisfactory level

### 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 acquire the principles of a range of advanced analytical techniques commonly used in industrial and academic research
- To be able to make a selection of an appropriate analytical technique or a combination of techniques for the analysis of targeted samples, based on the chemistry involved
- To interpret and draw sound conclusions from analytical chemical data obtained
- To prepare written scientific documents at a satisfactory level
- To deliver with confidence an oral presentation on a selected topic in analytical chemistry

## Mid-Year 3-hour Examination

Due: **June 2015**

Weighting: **50%**

Closed book examination.

On successful completion you will be able to:

- To acquire the principles of a range of advanced analytical techniques commonly used in industrial and academic research
- To be able to make a selection of an appropriate analytical technique or a combination of techniques for the analysis of targeted samples, based on the chemistry involved
- To interpret and draw sound conclusions from analytical chemical data obtained

## Delivery and Resources

### Prescribed text

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

### Recommended references

D.C.Harris, Quantitative Chemical Analysis, 8th Edition, W.H.Freeman and Company (2010).

D.A.Skoog, F.J.Holler and S.R.Crouch, Principles of Instrumental Analysis, 6th Edition, Saunders College Publishing (2007).

## Unit Schedule

Date Time Activity

March 39:00 – 10:30 Outline of Unit

Calibration Methods

11:00 – 1:00 Voltammetry

2:00 – 4:00 Information Retrieval

March 109:00 – 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 25, 2014

March 179:00 – 1:00 Laboratory Session

2:00 – 3:30 Voltammetry

4:00 – 5:30 Voltammetry

March 249:00 – 1:00 Laboratory Session

2:00 – 3:30 Atomic Absorption Spectroscopy

4:00 – 5:30 Atomic Absorption Spectroscopy

TUTORIAL SET 2 ON ATOMIC ABSORPTION SPECTROSCOPY

March 259:00 – 1:00 Laboratory Session

2:00 – 3:30 Electrophoresis

4:00 – 5:30 Electrophoresis

TUTORIAL SET 3 ON ELECTROPHORESIS

March 319:00 – 1:00 Laboratory Session

2:00 – 3:30 Mass Spectroscopy

4:00 – 5:30 Mass Spectroscopy

ASSIGNMENT 2 DUE AT 6 PM, APRIL 14, 2014

April 7 9:00 – 1:00 Laboratory Session

2:00 – 3:30 Mass Spectroscopy

4:00 – 5:30 Chromatography

Tutorial Set 4 on Mass Spectroscopy

April 28 9:00 – 1:00 Laboratory Session

2:00 – 3:30 Chromatography

4:00 – 5:30 Chromatography

TUTORIAL SET 4 ON CHROMATOGRAPHY

Assignment 3 due at 6 pm, May 12, 2014

June 29 9:00 – 10:30 Immunoassays

11:00 – 12:30 Immunoassays

TUTORIAL SET 5 ON IMMUNOASSAYS

1:30 – 5:30 Presentation of project work (CBMS825)

Classes Timetable: Please check <http://www.timetables.mq.edu.au/> for the official timetable of the unit. Lectures: The material presented in the lectures is important and you should not assume that all examinable material is available in the textbook or in printed notes. On the other hand, do not assume that all examinable material is to be found in the lecture notes. Tutorial: There are no tutorial sessions in this unit. Laboratory Work: Laboratory sessions commence in Week 2. You will undertake five experiments in E7B 354, the 2nd / 3rd Year teaching Laboratories. A laboratory roster will be issued in Week 1 to indicate which experiments you will be undertaking.

## **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](http://mq.edu.au/policy/docs/academic_honesty/policy.html)

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

Grading Policy <http://mq.edu.au/policy/docs/grading/policy.html>

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

Grievance Management Policy [http://mq.edu.au/policy/docs/grievance\\_management/policy.html](http://mq.edu.au/policy/docs/grievance_management/policy.html)

Disruption to Studies Policy [http://www.mq.edu.au/policy/docs/disruption\\_studies/policy.html](http://www.mq.edu.au/policy/docs/disruption_studies/policy.html) *The Disruption to Studies Policy is effective from March 3 2014 and replaces the Special Consideration Policy.*

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/](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://informatics.mq.edu.au/help/>.

When using the University's IT, you must adhere to the [Acceptable Use 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 acquire the principles of a range of advanced analytical techniques commonly used in industrial and academic research
- To be able to make a selection of an appropriate analytical technique or a combination of techniques for the analysis of targeted samples, based on the chemistry involved
- To interpret and draw sound conclusions from analytical chemical data obtained
- To prepare written scientific documents at a satisfactory level
- To deliver with confidence an oral presentation on a selected topic in analytical chemistry

#### Assessment tasks

- Assignments
- Laboratory Work
- Mid-Year 3-hour Examination

### 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 acquire the principles of a range of advanced analytical techniques commonly used in industrial and academic research
- To be able to make a selection of an appropriate analytical technique or a combination of techniques for the analysis of targeted samples, based on the chemistry involved
- To interpret and draw sound conclusions from analytical chemical data obtained
- To prepare written scientific documents at a satisfactory level
- To deliver with confidence an oral presentation on a selected topic in analytical chemistry



## Assessment tasks

- Assignments
- Laboratory Work
- Mid-Year 3-hour Examination

## 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 acquire the principles of a range of advanced analytical techniques commonly used in industrial and academic research
- To be able to make a selection of an appropriate analytical technique or a combination of techniques for the analysis of targeted samples, based on the chemistry involved
- To interpret and draw sound conclusions from analytical chemical data obtained
- To prepare written scientific documents at a satisfactory level
- To deliver with confidence an oral presentation on a selected topic in analytical chemistry

## Assessment tasks

- Assignments
- Laboratory Work
- Mid-Year 3-hour Examination

## 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 acquire the principles of a range of advanced analytical techniques commonly used in industrial and academic research
- To be able to make a selection of an appropriate analytical technique or a combination of

techniques for the analysis of targeted samples, based on the chemistry involved

- To interpret and draw sound conclusions from analytical chemical data obtained
- To prepare written scientific documents at a satisfactory level
- To deliver with confidence an oral presentation on a selected topic in analytical chemistry

## Assessment tasks

- Assignments
- Laboratory Work
- Mid-Year 3-hour Examination

## 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 acquire the principles of a range of advanced analytical techniques commonly used in industrial and academic research
- To be able to make a selection of an appropriate analytical technique or a combination of techniques for the analysis of targeted samples, based on the chemistry involved
- To interpret and draw sound conclusions from analytical chemical data obtained
- To prepare written scientific documents at a satisfactory level
- To deliver with confidence an oral presentation on a selected topic in analytical chemistry

## Assessment tasks

- Assignments
- Laboratory Work
- Mid-Year 3-hour Examination

## 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 acquire the principles of a range of advanced analytical techniques commonly used in industrial and academic research
- To be able to make a selection of an appropriate analytical technique or a combination of techniques for the analysis of targeted samples, based on the chemistry involved
- To interpret and draw sound conclusions from analytical chemical data obtained
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## Assessment tasks

- Assignments
- Laboratory Work
- Mid-Year 3-hour Examination

## Changes since last offering

There are no changes made in CBMS825 since the 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.