



# CBMS825

## Chemical Analysis II

S1 Day 2014

*Chemistry and Biomolecular Sciences*

### Contents

<u>General Information</u>	2
<u>Learning Outcomes</u>	3
<u>Assessment Tasks</u>	3
<u>Delivery and Resources</u>	4
<u>Unit Schedule</u>	5
<u>Policies and Procedures</u>	6
<u>Graduate Capabilities</u>	8
<u>Changes since last offering</u>	11
<u>Technology Used</u>	11

#### Disclaimer

Macquarie University has taken all reasonable measures to ensure the information in this publication is accurate and up-to-date. However, the information may change or become out-dated as a result of change in University policies, procedures or rules. The University reserves the right to make changes to any information in this publication without notice. Users of this publication are advised to check the website version of this publication [or the relevant faculty or department] before acting on any information in this publication.

## General Information

Unit convenor and teaching staff

Lecturer

Christopher McRae

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

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)

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

F7B 235

Credit points

4

Prerequisites

Admission to MLabQAMgt or PGDipLabQAMgt or PGCertLabQAMgt or MRadiopharmSc or MSc

Corequisites

Co-badged status

CBMS825 is co-badged with CBMS308 and CBMS708.

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 basic principles of a range of 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 25; April 14; May 12
<u>Laboratory Work</u>	40%	Week4,5,6,7,8,9,10,11,12,13
<u>Mid-Year 3-hour Examination</u>	50%	June 2014

### Assignments

Due: **March 25; April 14; May 12**

Weighting: **10%**

On successful completion you will be able to:

- To acquire the basic principles of a range of 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: **Week4,5,6,7,8,9,10,11,12,13**

Weighting: **40%**

This component consists of 5 laboratory experiments and 1 project.

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 basic principles of a range of 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 2014**

Weighting: **50%**

On successful completion you will be able to:

- To acquire the basic principles of a range of 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 (all available in University Library) D.C.Harris, Quantitative Chemical Analysis, 6th Edition, W.H.Freeman and Company (2003).

H.H.Willard, L.L.Merritt, Jr., J.A.Dean, F.A.Settle, Jr., Instrumental Methods of Analysis, 7th Edition, Wadworth Publishing Company (1988).

D.A.Skoog, F.J.Holler and T.A.Nieman, Principles of Instrumental Analysis, 5th Edition, Saunders College Publishing (1998).

Student Support Services

Macquarie University provides a range of Academic Student Support Services. Details of these services can be accessed at <http://www.students.mq.edu.au>.

## Unit Schedule

DateTimeActivity

March 39:00 – 10:30Outline of Unit

Calibration Methods

11:00 – 1:00Voltammetry

2:00 – 4:00Information Retrieval

March 109:00 – 1:00Laboratory Session

2:00 – 3:30Voltammetry

4:00 – 5:30Voltammetry

TUTORIAL SET 1 ON VOLTAMMETRY

ASSIGNMENT 1 DUE AT 6 PM, MARCH 25, 2014

March 179:00 – 1:00Laboratory Session

2:00 – 3:30Voltammetry

4:00 – 5:30Voltammetry

March 249:00 – 1:00Laboratory Session

2:00 – 3:30Atomic Absorption Spectroscopy

4:00 – 5:30Atomic Absorption Spectroscopy

TUTORIAL SET 2 ON ATOMIC ABSORPTION SPECTROSCOPY

March 259:00 – 1:00Laboratory Session

2:00 – 3:30Electrophoresis

4:00 – 5:30Electrophoresis

TUTORIAL SET 3 ON ELECTROPHORESIS

March 319:00 – 1:00Laboratory Session

2:00 – 3:30Mass Spectroscopy

4:00 – 5:30Mass Spectroscopy

## ASSIGNMENT 2 DUE AT 6 PM, APRIL 14, 2014

April 79:00 – 1:00 Laboratory Session

2:00 – 3:30 Mass Spectroscopy

4:00 – 5:30 Chromatography

Tutorial Set 4 on Mass Spectroscopy

April 289:00 – 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 29:00 – 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/)

## 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](http://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](http://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 - 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 basic principles of a range of 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 basic principles of a range of 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 basic principles of a range of 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 basic principles of a range of 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 basic principles of a range of 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 - 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 basic principles of a range of 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

## **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.