CBMS123/234

ALCHEMY, DRUGS and the QUEST FOR IMMORTALITY

UNIT GUIDE, SYLLABUS AND TIMETABLE

Session 3 – 2014/2015

First lecture Monday December 8, all lectures are web based and available on iLearn only

UNIT CONVENER – Dr Christopher McRae

http://ilearn.mq.edu.au
Welcome to CBMS123/234 – Alchemy, Drugs and the Quest for Immortality. This unique unit of study is worth 3 credit points and is designed to be useful to a wide range of students, with or without a scientific background. The unit is offered in Session 3 at 100 level as CBMS123; or 200 level as CBMS234; in external mode only.

Chemistry is the art and science of converting one substance into another and it has been an important factor in shaping our society. Metals, ceramics and plastics have changed and enhanced our lifestyle. Drugs, fertilisers and pesticides have saved millions of lives, but not without some
unforeseen environmental or social problems. When this happens, decisions need to be made in an informed, balanced fashion. An appreciation of such issues is necessary for better understanding of important problems that face society, both today and in the years ahead.

These units explore the way chemistry affects our lives, and the way chemists solve problems and perceive the world. Designed for students from all backgrounds, with or without previous chemical experience, the unit does not aim to teach chemistry but an appreciation of the world of chemistry and chemists. The unit looks at the impact that chemistry has had on civilisation and where the latest chemical innovations are likely to lead us. The commercial significance of some chemical processes and industries is addressed, emphasising the Australian context. The unit also examines connections between chemistry and other scientific fields as diverse as medicine, art and astronomy (to name a few), as well as revealing aesthetic and philosophical aspects of chemistry and of science in general.

The unit is taught through a combination of topical e-lectures and multimedia material. The unit is assessed by computer-based essays plus workshops. All aspects of the unit are accessible via the Internet, which facilitates external-mode studies. There is no laboratory component or final examination.

**Teaching staff**

Academic staff of CBMS involved in presenting units CBMS123 and CBMS234 are:

<table>
<thead>
<tr>
<th>Name</th>
<th>Role in unit</th>
<th>Contact details</th>
</tr>
</thead>
<tbody>
<tr>
<td>A/Prof Joanne Jamie</td>
<td>Lecturer</td>
<td>Contact Christopher McRae</td>
</tr>
<tr>
<td>Prof Peter Karuso</td>
<td>Lecturer</td>
<td>Contact Christopher McRae</td>
</tr>
<tr>
<td>Prof Brian Orr</td>
<td>Lecturer</td>
<td>Contact Christopher McRae</td>
</tr>
<tr>
<td>Dr Chris McRae</td>
<td>Unit Convenor</td>
<td><a href="mailto:christopher.mcrae@mq.edu.au">christopher.mcrae@mq.edu.au</a>; 02 9850 8288 F7B328</td>
</tr>
<tr>
<td>Ms Maree Nelson</td>
<td>Lecturer</td>
<td>Contact Christopher McRae</td>
</tr>
</tbody>
</table>

As CBMS123/234 are external mode units you would typically be expected to use e-mail and the Discussion Forum of the CBMS123/234 iLearn site to ask questions and contribute to on-line discussions (Forum => General Discussion). We will, of course, also be available for consultations on topics best dealt with in person. Please make an appointment first to see us by e-mail or telephone.

**Classes**

Four e-lectures are nominally scheduled each week but you can go to the lectures any time you want and as many times as you like. Each e-lecture has Web-based material, comprising downloadable lecture notes (for printing) and an audiovisual presentation (for viewing, with active links) and a lot-of-links page for internet resources. **CBMS123/234 has no final examination.** Therefore the timetable for preparing and submitting assignments must be strictly observed. The Department reserves the right to vary details of this schedule if necessary, with an undertaking that adequate notice of any such variations will be given to enrolled students. It is each student's responsibility to keep in regular touch with the Web-based information.
### Session 3 EOY Schedule for CBMS123/234 Alchemy, Drugs and the Quest for Immortality

**Lecturers:** PK = Prof. Peter Karuso; JJ = Dr Joanne Jamie*; MN = Ms Maree Nelson; BO = Prof. Brian Orr*

<table>
<thead>
<tr>
<th>Week #</th>
<th>commencing</th>
<th>e-lecture</th>
<th>e-lecture</th>
<th>Assignment / activities scheduled this week</th>
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<tbody>
<tr>
<td>1</td>
<td>8 Dec</td>
<td>L0: Introduction – Introductory Remarks and navigating this unit</td>
<td>L1: Chemistry through the Ages BO</td>
<td>Familiarisation with unit notes, Library services, e-resources, … Prepare for Workshop W1</td>
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<tr>
<td></td>
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<td>L3: Aluminium from Ore to BO Oven plus Preview of L4, L5 &amp; E1</td>
<td>L2: Elements of Chemistry BO L4: Bridges for Civilisation BO</td>
<td>W1 Quiz on L1-5 Prepare for Workshop W1 and Essay E1</td>
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<td></td>
<td></td>
<td>L7: Health, Life &amp; Natural Products PK – Salvarsan to Penicillin;</td>
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<td>W2 is due at 9 am Dec 19</td>
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<td>RECESS (25 Dec – 29 Dec) Prepare Essay E2 and Workshop 3</td>
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<td></td>
<td></td>
<td>L11: Industrial Catalysts – BO The Legacy of Fritz Haber</td>
<td>L12: Molecules Everywhere BO Space, Primordial Slime …</td>
<td>Prepare for Workshop 4 W4 Quiz on L15-16 W4 is due at 9 am Jan 9</td>
</tr>
<tr>
<td>4</td>
<td>5 Jan</td>
<td>L13: Is Chemistry Art or PK Science?</td>
<td>L14: New Materials – JJ Modern Alchemy</td>
<td>E2 Write a Poem! On Chemistry or chemical philosophy or an essay of the Philosophy of Chemistry (L17-21) E2 is due at 9 am Jan 16 Prepare for Workshop W5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>L15: Chemistry in and for the MN Environment #1</td>
<td>L16: Chemistry in and for the MN Environment #2</td>
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<tr>
<td>5</td>
<td>12 Jan</td>
<td>L17: Chemical Identity PK – What are you?</td>
<td>L18: Chemical Identity – JJ How much of you is there?</td>
<td>E2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>L19: Chemical Identity PK – What is going on?</td>
<td>L20: Chemical identity – The same … but different</td>
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<tr>
<td>6</td>
<td>19 Jan</td>
<td>L21: When Things Go Wrong … PK</td>
<td>L22: A Famous Chemist – BO Linus Pauling</td>
<td>W5 Quiz on L13, 17-22 W5 is due at 9 am Jan 23</td>
</tr>
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* Please note, the e-lectures given by Prof. Brian Orr are administered by Dr Chris McRae. Note: CBMS reserves the right to vary details of this schedule if necessary.
There is no textbook for CBMS123/CBMS234, however, the following books are highly recommended reading:


3 Roald Hoffmann, "The Same and Not The Same" (Columbia UP, N.Y., 1995; ISBN 0 231 10138 4 or 0 231 10139 2), much of the lecture material is based on this book.


Additional print- and web-based material will be recommended as the unit progresses; keep an eye on the “important news” on the web page – also, see the reading list:

Further Readings
- Ronald Breslow, Enzymes, the machines of life (Scientific Pub. Dept., Sudbury, MA, 1986; ISBN 0 8927 8155 6)
- Alan Chalmers, What is this thing called science? (U of Queensland Press, St Lucia, 1999; ISBN 0 7022 3093 6)
- Simon Garfield, Mauve: How one man invented a colour that changed the world (Faber & Faber, London, 2000; ISBN 0 571 20197 0)
- E. Heilbroner and F. A. Miller, A Philatelic Ramble through Chemistry (Wiley-VCH, Zürich, ISBN 3-906390-31-4)
Copies of some of these books (and other relevant ones) will be placed in the Reserve section of the Library.

Selected book extracts will occasionally be reproduced (to the extent permissible by copyright law) on the CBMS123/234 iLearn page. One copy of each may then be downloaded by each student for private use. It may also be useful on occasions to consult a general chemistry textbook (e.g., Silberberg, Smith, or Aylward & Findlay) that some students already know of. The Library has many possibilities at call number QD33. The University Library also has a good collection of chemistry-related videos available for viewing. There are many useful resources on the Web. Access to some that are highly recommended can be gained via the “Lots of Links” section on the CBMS123/234 iLearn page or by keying in known URLs or by using your favourite search engine.

### Unit web page

The web page for these units can be found at: [http://ilearn.mq.edu.au/](http://ilearn.mq.edu.au/) You are expected to access the web pages regularly, where you may find announcements, links to interesting internet facilities and sites of interest to the course, downloadable software, and lots of other interesting stuff. In addition all the lectures and printed notes for the lectures will be found only on the unit web page and it is up to you to keep up with the lectures and assessments.

### Technology Used

You are expected to have access to the internet and access the unit iLearn site on a regular basis. Please note information may also be sent by e-mail to your student e-mail account so please look at your e-mail account on a regular basis. All lectures are on-line and are accessible via the Echo360 EchoCenter page in iLearn. If you are unfamiliar with the Echo360 EchoCenter then refer to the "Student Guide to Echo360 Lecture Recordings" available from: [http://www.mq.edu.au/iLearn/student_info/lecture_recordings.html](http://www.mq.edu.au/iLearn/student_info/lecture_recordings.html).

All unit notes are presented as PDF files that require acrobat reader: [http://get.acrobat.com/uk/reader/](http://get.acrobat.com/uk/reader/)

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

### Expected Learning outcomes

#### Aims:
- To appreciate the role of chemistry in the history of the universe, world and society
- Integrate your previous experiences and knowledge into a chemical framework
- Appreciate the role of the chemist in human history and modern society, now and into the future

#### Objectives:
CBMS123/234 is designed to provide:
- A basic understanding of the role of chemistry in modern life
- An appreciation of the role of chemistry in history, art and science
- A basic understanding of how chemistry works and is different to other sciences
- Appreciate the complexity and metaphors used by chemists to understand chemistry
- An insight into the work of chemists and why they find the subject so fascinating
- Appreciate what it takes to get a Nobel Prize.
Goals:
By the end of CBSM123/234 you should be able to:

- Identify issues facing humanity that are caused by chemicals or have have their solution in chemistry
- Be able to discuss important issues that have a chemical basis from a rational perspective
- Be able to critically evaluate non-specialist literature (e.g. Newspapers) that discuss chemical and biochemical issues
- Understand the role of chemistry and the molecular sciences in drug discovery and medicine
- Understand the role of chemistry as the source and solution of environmental issues
- Understand the role of chemistry in industry
- Understand how chemists approach scientific and seek to solve chemical questions
- Identify chemical issues facing humanity

In addition to the unit-based learning outcomes above, these units will also help develop the graduate capabilities that “University’s graduates need to develop to address the challenges, and to be effective, engaged participants in their world”. Graduate capabilities are viewed as essential for all graduates, irrespective of their course of study. Graduate capabilities are the building blocks for developing the attributes valued in a university graduate. Some of the attributes and skills that CBMS123 can help you develop are:

- **Problem Solving and Research Capability, Critical, Analytical and Integrative Thinking and being Creative and Innovative**: Within these units you will have the opportunity to develop your problem solving and research skills and show your creativity and innovation through written assignments and on-line workshops. The problem solving will include situations where there are clear solutions as well as situations demanding critical, analytical and integrative thinking. In some cases you will be using specialised technology for the discovery of information, the analysis of data and the presentation of results.

- **Effective Communication**: CBMS123 will help equip you with written communication skills, through essays and workshops. Part of your assessment will be concerned with your ability to communicate in clear, very concise and appropriate, context-dependent modes (workshops). You will also be assessed on your ability to use different communication modes, for example the use of poetry to describe chemistry, chemists or chemical concepts.

- **Socially and Environmentally Active and Responsible**: Much of the content of CBMS123 deals with environmental and social issues pertaining to chemistry and chemicals from Bohpal to thalidomide, swine flu and global warming to destruction of the ozone layer and rising salinity, giving you the opportunity to develop a sense of responsibility and mutual obligation to use chemistry and chemical inventions wisely.

- **Engaged and Ethical Local and Global citizens**: Engaged and ethical behaviour will be addressed through the compelling stories, interesting dualities and surprising connections of chemistry to advances in civilization, global crises, human dramas and the fascinating way chemistry has impacted all our lives for millennia.

- **Commitment to Continuous Learning**: The coursework is specifically designed to stimulate curiosity, interest and the desire to seek more information. This will lead you to a continual pursuit of knowledge for its own sake.
Teaching and Learning Strategy

Electronic / Internet Services

The CBMS123/234 unit website, at [http://ilearn.mq.edu.au](http://ilearn.mq.edu.au), allows you access to lecture notes and other resources. **To log in, use your Student OneID plus your regular password.** Lecture notes are put on the Web in advance with the audio/visual recordings (L1-L24). L0 is the orientation lecture given on the first day of semester and L23 is the Nobel Prize lecture.

All students should be regularly accessing the CBMS123/234 iLearn site, which contains important information. This is a vital requirement for this unit, with its progressive assessment and no final examination. **Regular study of the e-lectures is also expected.**


Macquarie University Library offers a highly recommended suite of **Undergraduate Training Courses**, described at the following:


CBMS123/234 students needing enhanced library/Internet capability can *either* take face-to-face courses in the Library (bookings not required; schedules on the Web) *or* do it yourself via [http://infoskills.mq.edu.au/](http://infosskills.mq.edu.au/).

**Academic literacies and related study skills**

Please also look at the Macquarie StudentWISE web site:


for information, researching, on essay writing, especially referencing and general study skills. Science students in particular may need some extra training when it comes to writing essays. This unit is assessed through workshops and essays and it would be a pity if you were marked down for not properly referencing your work and/or poor essay writing style. StudentWISE can help!

**Assessment Tasks**

There is no final examination for CBMS123 or CBMS234. Assessment will be based entirely on Workshops (W1-W5) and Essays (E1-E2), with maximum available marks distributed as follows:

- Each Workshop (W1 – W5) = 10% (50% total)
- Each Essay (E1 – E2) = 25% (50% total)

CBMS123 and CBMS234 students will be marked and graded as two separate cohorts, with a higher standard expected for CBMS234. The length of each CBMS123/234 Essay is expected to be 1500-2000 words. Each of the workshops consist of 20 randomly chosen multiple choice questions. In order to successfully complete CBMS123/234 you must submit *satisfactory efforts for all* the following assignments:

**Workshop Topics**

<table>
<thead>
<tr>
<th>W#</th>
<th>Workshop topic</th>
<th>Preparation/submission dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>W1</td>
<td>&quot;Chemistry: Then and Now&quot;</td>
<td>Prepare in wks 1; submit 9 am Fri 12 Dec</td>
</tr>
<tr>
<td>W2</td>
<td>&quot;Drugs or Biomolecules&quot;</td>
<td>Prepare in wks 2; submit 9 am Fri 19 Dec</td>
</tr>
<tr>
<td>W3</td>
<td>&quot;Catalysts: Industrial and Biological&quot;</td>
<td>Prepare in wks 3 &amp; 4; submit 9 am Fri 2 Jan</td>
</tr>
<tr>
<td>W4</td>
<td>&quot;Environmental Chemistry&quot;</td>
<td>Prepare in wks 5; submit 9 am Fri 9 Jan</td>
</tr>
<tr>
<td>W5</td>
<td>&quot;Chemical Philosophy&quot;</td>
<td>Prepare in wks 6; submit 9 am Fri 23 Jan</td>
</tr>
</tbody>
</table>
Essay Topics

<table>
<thead>
<tr>
<th>E#</th>
<th>Essay topic</th>
<th>Preparation/submission dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>E1</td>
<td>&quot;Pick a Book Chapter or a Chemical Industry&quot;</td>
<td>Prepare in wks 1 &amp; 2; submit 9 am Wed 24 Dec</td>
</tr>
<tr>
<td>E2</td>
<td>&quot;Write a Poem about Chemistry&quot;</td>
<td>Prepare in Recess, wks 3 &amp; 4; submit 9 am Fri 16 Jan</td>
</tr>
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</table>

Deadlines

The deadline for submission of each assignment (W1-W5, E1-E2) is clearly defined on the timetable. Marks will be deducted for late submission (at 10% per day, unless formal justification is provided through the student centre – See Special Consideration Requests in the next section). Students need to work steadily on each assignment, aiming to finish preparation well in advance of its submission deadline.

All assignments (Essays & Workshops) are due in electronic form not later than 9 am on the submission date.

University Policy on Grading

Academic Senate has a set of guidelines on the distribution of grades across the range from fail to high distinction based on the level of understanding and comprehension achieved.  


The raw aggregate mark for the unit (i.e., the total of marks from all assessment items) is not the same as the SNG. Results will be scaled to ensure that there is a degree of consistency between the final SNG and student attainment. University policy does not require that a minimum number of students are to be failed or passed in any unit. The process of scaling will never change the ranking order among students. As a very rough guide, in this unit, you will need to achieve about 55 raw marks for a Pass, 69 for a Credit, 79 for a Distinction and 84 for a High Distinction. These numbers vary only slightly from year to year and will be converted to an SNG by application of a normalised distribution. Irrespective of your raw aggregate mark you must submit satisfactory efforts for ALL assessment tasks to pass CBMS123/234.

Extension and Special Consideration Requests

The University recognises that there may be circumstances where a student is prevented by unavoidable disruption from performing in accordance with their ability. The University has a policy on special consideration request that may be found at:

http://www.mq.edu.au/policy/docs/special_consideration/policy.html

You will need to lodge your request for special consideration by doing the following:

1. Log onto Ask.MQ (http://ask.mq.edu.au/)
2. Go to "My Enquiries"
3. Login with your OneID
4. Under "Forms and Requests", select "Submit request for Special Considerations" from the drop-down menu
5. Fill in your relevant details
6. Attach supporting document by clicking "Add a reply", click "Browse" and add scanned documents
7. Take the original supporting documentation to be sighted at your faculty office.

**University Policy on Assessment and Examinations**

To articulate the principles that underpin the Macquarie University approach to assessment of student learning and feedback. These principles guide the procedures to be used in the conduct and management of assessment and feedback practices in all coursework units.

The examination period following week 5 (week 6) of session 3 is part of the academic year and all students are required to make themselves available during this period.

The University policy of examinations can be found at:


**Academic Honesty**

The University declares that it is a “fundamental principle” that “all staff and students act with integrity in the creation, development, application and use of ideas and information”. This means that:

- all academic work claimed as original is the work of the author making the claim
- all academic collaborations are acknowledged
- academic work is not falsified in any way
- when the ideas of others are used, these ideas are acknowledged appropriately

You should be familiar with the University’s Policy on Academic Honesty practices and its Statement on Ethics. These can be found in the *Handbook of Undergraduate Studies* or on the web at:


The policies and procedures explain what academic dishonesty is, how to avoid it, the procedures that will be taken in cases of suspected dishonesty, and the penalties if you are found guilty.

**Feedback**

We value your feedback to improve our unit and reflect on our practices. The University policy on feedback can be found here: [http://www.mq.edu.au/policy/docs/student_feedback/policy.html](http://www.mq.edu.au/policy/docs/student_feedback/policy.html)

**Other university policies**

Macquarie University is developing a number of policies in the area of learning and teaching. Approved policies and associated guidelines can be found at Policy Central: [http://www.mq.edu.au/policy](http://www.mq.edu.au/policy).
Student Support Services

Macquarie University provides a range of Student Support Services. Details of these services can be obtained at:

http://students.mq.edu.au/support/ and

http://students.mq.edu.au/campus_life/campus_wellbeing_support_services/

Changes to the Unit Since Last Offering

There have been no changes to the Session 3 version of this unit since its first offering in 2012.

We hope you will find this unit both educational and fun! Good luck with your studies.

Christopher McRae

(Lecturer-in-charge)