DEPARTMENT OF CHEMISTRY AND BIOMOLECULAR SCIENCES

UNIT OUTLINE - GUIDE, SYLLABUS AND TIMETABLE

CBMS101 – FOUNDATIONS OF CHEMISTRY (EXTERNAL)

THREE (3) CREDIT POINTS

SEMESTER 2, 2014, X2 (external mode)

UNIT CONVENOR – Mrs Maree Nelson

F7B333, PH 9850 8295, E-MAIL maree.nelson@mq.edu.au

NO PREREQUISITES

NCCW: HSC CHEMISTRY BAND 5 OR ABOVE

URL  ilearn.mq.edu.au

(login and follow prompts to CBMS101 Foundations of Chemistry (External))
CBMS101X UNIT GUIDE

Year and Semester: Semester 2, 2014
Unit convenor: Mrs Maree Nelson
Prerequisite: None
NCCW: HSC Chemistry Band 5 and above.

Students in this unit should read this unit guide carefully. It contains important information about the unit. If anything in it is unclear, please consult the unit convenor.

### ABOUT THIS UNIT

<table>
<thead>
<tr>
<th>Credit Points:</th>
<th>3 (equivalent to an average of 9 hours/week of contact and self study)</th>
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<tr>
<td>Contact Hours:</td>
<td>The unit consists of three on-campus sessions involving lectures and tutorials (9 am – 1 pm) and three-hour practical classes (1.30 pm – 4.30 pm) each day. The on-campus sessions will be 16-17 August, 26-28 September and 25-26 October. All on-campus sessions are compulsory.</td>
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<tr>
<td>When Offered:</td>
<td>X2 - Day; Second Half-Year</td>
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</table>
| Staff Contact:| Mrs Maree Nelson  
Department of Chemistry and Biomolecular Sciences  
Phone: 9850 8295  
Fax: 9850 8313  
E-mail: maree.nelson@mq.edu.au |

This unit has no prerequisites and is equivalent to HSC Chemistry. It provides an introduction to the principles and practical aspects of chemistry and can prepare students for entry to CBMS102 General Chemistry and CBMS103 Organic and Biological Chemistry. Additionally it is intended as a one semester general purpose unit for non-science and science majors, including non-chemistry majors. The central focus of the unit is to make chemistry understandable and interesting and to teach some problem-solving skills that are useful in other studies and in the world beyond university, particularly in the workforce. The unit introduces atoms and molecules; elements and compounds; physical and chemical properties; the periodic table; mass and energy aspects of chemical reactions; and many other chemical concepts such as equilibrium at a basic level. Carbon compounds will be introduced. Chemical principles are related to the real lives of students and our world, with topics such as global warming, air pollution, acid rain, energy production and renewable fuels.

Students who have completed HSC Chemistry (or equivalent) in the previous 5 years and gained a pass Band 5 and above are excluded from CBMS101, they are advised to study CBMS102 instead.

### TEACHING STAFF

- Mrs Maree Nelson F7B 333, ph 9850 8295, email maree.nelson@mq.edu.au

Mrs Maree Nelson is the coordinator of this unit and should be consulted if you have administrative or organisational problems. Any questions can be asked by email – put CBMS101 in the header of the email message. If you are able to come on campus throughout the semester, feel free to ask any question best in person. It is wise to organise an appointment first by phoning or emailing beforehand to ensure availability.
**REQUIRED AND RECOMMENDED TEXTS AND/OR MATERIALS**

Prescribed Texts and Materials:

The prescribed text is:


You are expected to have a copy of the text book. The brief lecture summaries and the lecture overheads discussed below are of little value without the text.

**Laboratory coat** must be worn for each laboratory session along with shoes which fully enclose feet.

**Unit Notes:**

*Laboratory Notes for CBMS101*

These are available from the University Co-op. Bookshop, or can be printed from the CBMS101X website. It is not possible to meet the requirements of the unit without a copy of these notes.

*CBMS101 2014 Lecture Powerpoint Slides (from first semester)*

These can be printed from the CBMS101X ilearn web page using any web browser such as Mozilla, Netscape, Internet Explorer or Safari. The URL is:

https://ilearn.mq.edu.au

Additional Resources for those seeking more (available in the Co-op Bookshop):


**CLASSES**

- The on-campus sessions will be 16-17 August, 26-28 September, and 25-26 October. For each day, lectures and tutorials will run from 9am-1pm and practical classes from 1.30pm-4.30pm. Practical classes will be held in E7B308 (First Year Chemistry Laboratory).
- All lectures and tutorials will be held in E6A133 except for Saturday 25 October when they will be held in E7B264.
- Please come straight to the class for commencement at 9am. You will NOT be required to sign-on at the Centre for Open Education.
- **On-campus sessions are compulsory.** Repeat students may request practical exemption, but it is up to the discretion of the unit coordinator as to whether exemption is granted. **Non-attendance of the on-campus session is only allowed due to medical or other extenuating circumstances, of which details must be formally lodged** (see non-attendance and special request details later).
- It is very important to prepare well and **in advance** for the on-campus sessions including the first one. Purchase your text book as early as possible and begin working through each set chapter. Complete the set tutorial questions for each chapter and then **come prepared with questions** to the on-campus sessions. Lecture slides and lecture audio from the internal first semester unit are available on the CBMS101 website. It is advisable to bring the printed lecture slides for the
relevant sections to the on-campus sessions (refer to the program later in these notes). Many of them will be used in the external lectures but not all.

- It is highly recommended that you study continuously throughout the semester – in fact it is essential if you hope to achieve a good grade. At the end of these notes is a suggested study schedule to help you timetable and optimise your study for CBMS101X.

UNIT WEB PAGE

The web page for this unit can be found at ilearn.mq.edu.au

ILearn is the name for Macquarie University’s new Learning Management System (LMS). The iLearn online learning environment enables learning, teaching, communication and collaboration. It is used to make lecture notes, laboratory notes, discussion forums, digital lecture recordings and other learning resources available to students online. See http://help.ilearn.mq.edu.au/ for more information.

Much vital CBMS101 material and information is available via iLearn. The CBMS101 website will be used for the posting of important announcements. The web may also be used to check on your marks as the unit proceeds. Copies of many of the overheads to be presented in lectures are also available via the web as well as laboratory notes, unit outline, past exams and tests etc.

If you have off-campus internet access, simply start your web browser such as Firefox, Internet Explorer or Safari and proceed as below. You may also use the computers in the University Library. Once the browser program is running, type in the iLearn URL:

https://ilearn.mq.edu.au

Your User Name is your Macquarie Student ID Number, which is an 8-digit number found on your Campus Card. The password is your myMQ Student Portal password. This will be the original MQID password (2 random characters followed by your date of birth in ddmmyy format) that was sent to you on enrolment, unless you have already changed your password in the myMQ Student Portal. If you have any problems with iLearn go to https://ask.mq.edu.au/account/forms/display/enquiry/

You are expected to access the unit web site frequently. This contains important information including lecture slides on ALL the topics to be covered; your marks for practicals, quizzes and mid-session exam; and past exam papers, including several with answers. The online discussion forum has proved very popular with students in the past with study groups set up, many questions answered between students and lecturers and interesting websites recommended. Additionally, the website will also be used to post important messages and links to internet facilities and sites of relevance to the course, downloadable software, and lots of other interesting material.

After the initial mailout from Centre for Open Education, ALL CORRESPONDENCE WILL BE VIA THE CBMS101X WEBSITE OR EMAIL TO YOUR STUDENT EMAIL ADDRESS.

EXPECTED LEARNING OUTCOMES

At the conclusion of the unit it is expected that students will:

- have achieved a fundamental understanding of general chemical principles applicable to chemistry and other science disciplines, particularly the role of chemistry in modern society relating to current issues such as global warming and everyday life experiences;
- be able to write the chemical formulae of simple chemical compounds and balance basic chemical equations;
• have developed graduate capabilities ranging from chemistry specific skills including the analytical capability in solving chemical problems, processing and interpretation of chemical data, and acquaintance of information technology to social and environmental awareness;
• have acquired basic laboratory skills and be familiar with general laboratory safety issues;
• have acquired some interpersonal skills through teamwork and communication during laboratory sessions and tutorials.

In addition to the discipline-based learning objectives, all academic programs at Macquarie seek to develop graduate capabilities in a range of areas. One of the aims of this unit is that students develop their skills in the following:

• Critical, analytical and integrative thinking: An example is the collection and analysis of data from laboratory experiments using theoretical knowledge gained in lectures and from private “reading”.
• Problem-solving: This is a very important aspect of the unit with both tutorials and laboratory work centred around analysis of a problem, using subject specific knowledge to solve the problem and then being able to explain the solution to classmates and lecturers.
• Effective communication: Also an important skill, both oral and written, practised in both laboratory sessions (report writing and discussion with team members) and tutorials (often involve presentation to the class).
• Being engaged and ethical citizens: Willing participation in team work especially in the laboratory but with individual analysis and reporting of results. Scientific honesty is vital, especially in the presentation and interpretation of laboratory results.
• Being socially and environmentally active and responsible: Correct disposal of waste and an awareness of health and safety regulations is very important knowledge gained in the laboratory sessions. Students are constantly encouraged to apply and adapt chemical knowledge learned in this unit to the real world. Chemical concepts relevant to topical issues such as global warming, acid rain, energy production, photochemical smog are taught giving students necessary introductory knowledge to such topics to encourage further interest in environmental issues.
• Professional and personal judgement and initiative: CBMS101X requires the student to manage time effectively throughout the semester. Passing the unit without good time management and work organisation skills is difficult.

TEACHING AND LEARNING STRATEGY

Syllabus

The syllabus for CBMS101X detailing topics to be covered and textbook sections to be studied is set out on separate sheets near the end of this document. Consult this syllabus frequently to be sure that you have covered all the required material. Please ensure that you bring the correct experimental notes to each laboratory session.

Unit Requirements

The unit requirements are that you:

• Participate in all laboratory sessions, complete the pre-lab before the lab session and submit laboratory reports at the completion of each session. If less than 5 of the 6 experiments are completed, regardless of reason, it will not be possible to pass the unit.
• Attempt at least 4 of the 6 in-class quizzes.
• Attempt the mid-semester test on Sunday 28 September 2014.
• Sit, and demonstrate satisfactory competency in, a final examination of three hours duration.

Students unable to attend an on-campus session due to illness or misadventure (defined in the ‘Student Information’ section of the University Undergraduate Studies Handbook) should provide the University with documentation including a Disruption to Studies Application and a Professional Authority Form as soon as possible after any such absence. If you miss more than one laboratory session through illness or misadventure, you should request withdrawal without penalty. If you miss any laboratory session without adequate evidence of illness or misadventure, you may be withdrawn from the unit.

Unit Expectations
In addition to the formal requirements for the unit, there are other actions you should take to have a reasonable chance of success. They are the same things that you need to do in order to demonstrate that you have been performing satisfactorily up to the time of any request for special consideration.

The unit expectations are that you will:

• continuously work before on-campus sessions through reading of recommended material, attempting all set problems and preparing for the laboratory classes

• attend all on-campus sessions
• demonstrate reasonable competence in all laboratory preparation exercises and attend each lab class
• demonstrate reasonable competence in the laboratory with submission of report before leaving the lab
• perform satisfactorily in the final exam.

If you fail to meet the formal unit requirements, you may be withdrawn from the unit, but if you fail to meet these expectations, the probability of obtaining a passing grade will be greatly reduced.

Lectures
Lectures are a very brief presentation of the syllabus with concentration on the more challenging aspects of the unit. Copies of many of the overhead powerpoint slides to be presented in lectures will be available on the CBMS101X iLearn web pages. These are the slides from the first semester internal offering of the unit so there are many more slides there than will be seen in the external lectures. They will be in PDF format so you can view them only if your computer has a Version 4 or later Adobe Acrobat Reader (can be downloaded from the CBMS101X home page). It would be advantageous for you to download the lecture slides and bring them to your lectures so you can spend most of the lecture time listening to the presenter and less on transcribing notes. But be warned! You may be tempted to believe that reading the slides can substitute for attendance at the lectures. Many slides make little sense without the accompanying discussion. Moreover, not all slides used in lectures are necessarily included in the material that is placed on the Web.

Taped lectures from the internal first semester offering will be available on the CBMS101X iLearn website and should be used as an additional resource.

Do not assume that having the powerpoint slides and listening to iLectures are a suitable substitute for attending lectures – they are NOT.
Tutorials
Tutorials in CBMS101X will take place after the morning lectures and before the lunch break.

To prepare for tutorials you must attempt as many as possible of the textbook questions listed on the tutorial sheets attached. As a general rule, the topics included are those covered in lectures. During each tutorial session you should ask questions about any problem that caused you difficulties, but in the absence of questions, your tutor will ask the class to work through the examples listed on the tutorial sheets. You will only benefit from the tutorials if you have prepared in advance.

Laboratory Work
Details of the laboratory work are contained in the notes available from the University Bookshop and available on the web. You will be scheduled to complete a total of six experiments. Students repeating CBMS101 may be given an exemption from the practical component. They need to meet with Mrs Nelson to discuss this possibility. Students attempting CBMS101 for the third time must complete all of the practical work again.

For safety reasons you will not be permitted to participate in laboratory sessions unless you are wearing a lab coat and sturdy shoes which cover your feet. The Laboratory Notes must be read and some simple preparatory exercises completed before you attend the laboratory session. The pre-lab exercises must be completed and given to your demonstrator immediately after you arrive at the laboratory at 1.30pm. You will not be permitted to begin the practical until you have submitted your completed pre-lab to your demonstrator. The laboratory work must be completed in the 3-hour practical time allotted and the report handed in at the end of the practical session. Good preparation is essential to understand and benefit from the lab work.

Your marked laboratory report will be returned to you by post as quickly as possible. While comments may be provided for your guidance, your grade (for the lab report) will reflect the quality of your answers.

Plagiarism is not accepted and no marks will be awarded to any student involved in plagiarising.

In-class Quizzes
Six in-class quizzes will encourage students to prepare for the on-campus sessions before attending them. The best four quiz results will be used for assessment. The quizzes will be held at the completion of each morning session (except for Sunday 28 September when the mid-semester test is held), and will consist of a small number of multiple choice questions about material covered during that morning.

RELATIONSHIP BETWEEN ASSESSMENT AND LEARNING OUTCOMES

Assessment: The grades you achieve at Macquarie University are descriptive rather than numeric. The assessments and conditions on your performance (attendance, completion, etc) help to decide which of these descriptive grades applies to your work for the entire unit.

Your raw marks from assessments are combined into a weighted sum. The weighted sums for the whole class are ranked, and compared with rankings for the same unit in previous offerings and across other units for appropriate consistency. This process of comparison allows for the identification of any unusual influences on class performance that might warrant the weighted sums of marks being scaled.
or otherwise altered. The numerical cut-offs for each descriptive grade are then determined. The numerical value with which you will be issued (the Standardised Numerical Grade, SNG) is determined to match your descriptive grade by standardising the weighted sums of raw marks to match standard scores out of 100. The SNG gives you an indication of how you have performed within the band for your descriptive grade. As the SNG is the result of scaling the weighted sum of your raw marks, you won't be able to:

- work out your exam mark based on the assignment marks you already know and the SNG;
- determine that you were "one mark away" from a different grade.

It is our professional responsibility as your teachers to assign you a descriptive grade that accurately reflects your performance in a unit. Our grading decisions are subject to scrutiny from our academic colleagues at the Department, Faculty and University Senate level.

The Grades range from High Distinction to Fail, and are defined as follows:

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<tr>
<th>Grade</th>
<th>SNG</th>
<th>Description</th>
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<tr>
<td>HD</td>
<td>85-100</td>
<td>Work of outstanding quality demonstrating a very high level of understanding of content demonstrated clearly in written assessments, quizzes, and work in the laboratory. Being able to demonstrate a high level of proficiency in problem solving involving energy calculations, masses and moles, pH and pOH; being able to write balanced equations, identify types of reactions; being able to draw Lewis structures for simple molecules and ions; being able to work safely and efficiently in the laboratory, taking measurements, analysing results, drawing conclusions and writing reports, under the guidance of a demonstrator.</td>
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<tr>
<td>High Distinction</td>
<td></td>
<td></td>
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<tr>
<td>D</td>
<td>75-84</td>
<td>Work of superior quality in the same areas of performance as above.</td>
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<tr>
<td>Cr</td>
<td>65-74</td>
<td>Work of predominantly good quality, demonstrating a reasonable grasp of content together with the ability to perform basic tasks as described above.</td>
</tr>
<tr>
<td>P</td>
<td>50-64</td>
<td>Satisfactory achievement of unit objectives.</td>
</tr>
<tr>
<td>Pass</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>0-49</td>
<td>Failure to achieve unit objectives.</td>
</tr>
<tr>
<td>Fail</td>
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Your grade awarded at the completion of the unit will be based on marks obtained as follows:

- In-class quizzes: 15%
- Mid-term Exam: 15%
- Laboratory: 15%
- Final Exam: 55%

- **In-class quizzes**: see *Teaching and Learning Strategy.*
• **Mid-term Exam**: There will be a 50 minute test (/15%) on day 5 of the on-campus session, *i.e.*, 28 September 11.45 am. This will cover all topics up to the end of ‘Gases’ (chapter 11). This is designed to give you specific feedback on your understanding of the topics up to this stage to assist you in your further study of the unit.

• **Laboratory**: The 15% laboratory component is made up from the 6 equally valued practical sessions with their reports. Students must complete all 6 experiments except in the case of a medical or other unexpected problem when a minimum of 5 experiments is required in order to pass the unit.

Students unable to attend a laboratory class due to illness or misadventure (defined in the ‘Student Information’ section of the University Undergraduate Studies Handbook) should provide the University with documentation including a Professional Authority Form with Disruption to Studies notification as soon as possible after any such absence. Official documents must be lodged online at [https://ask.mq.edu.au/account/forms/display/enquiry/](https://ask.mq.edu.au/account/forms/display/enquiry/). In special circumstances it may be possible to attend an alternative laboratory class, but this must be arranged in advance with the unit coordinator. If you miss more than one laboratory session through illness or misadventure, you should request withdrawal without penalty.

• **Final exam**: The final exam (/55%) will be 3 hours in length with 10 minutes reading time. It is designed to address specific understanding of all the topics presented within the course and to show that the knowledge obtained can be applied to new problems. You must perform satisfactorily in the final exam to pass CBMS101X.

Your marks/grades (in-class quizzes, mid-term exam, laboratory) will be placed on the CBMS101X web site. The **minimum requirement** to achieve a passing grade for CBMS101X is satisfactory performance in separately both the final exam and the laboratory component.

**Final Examination Details**: The examination timetable will be available in Draft form approximately eight weeks before the commencement of the examinations and in final form approximately four weeks before the commencement of the examinations. See [www.timetables.mq.edu.au/exam](http://www.timetables.mq.edu.au/exam). You are expected to present yourself for examination at the time and place designated by the University in the Examination Timetable. This could be any day after the final week of semester and up until the final day of the official examination period. It is Macquarie University policy to **not set early examinations** for individuals or groups of students. All students are expected to ensure that they are available until the end of the teaching semester, that is, the final day of the official examination period.

The only exception to sitting an examination at the designated time is because of documented illness or unavoidable disruption. Absence from the final exam will result in a grade of F except in the case of a genuine medical emergency or misadventure as defined by the University (see below). In these circumstances you may wish to consider applying for Disruption to Studies at [https://ask.mq.edu.au/account/forms/display/enquiry/](https://ask.mq.edu.au/account/forms/display/enquiry/).

**DISRUPTION TO STUDY NOTIFICATION INCLUDING NON-ATTENDANCE AND EXTENSIONS**

The University is committed to equity and fairness in all aspects of its learning and teaching. In stating this commitment, 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 disruption to study that may be found at http://www.mq.edu.au/policy/docs/disruption_studies/policy.html. The University recognises that at times an event or set of circumstances may occur that

- could not have reasonably been anticipated, avoided or guarded against by the student AND
- was beyond the student’s control AND
- caused substantial disruption to the student’s capacity for effective study and/or completion of required work AND
- substantially interfered with the otherwise satisfactory fulfilment of a unit or program requirements AND
- was of at least three (3) consecutive days duration within a study period and/or prevented completion of a formal examination.

This policy is instituted to support students who experience serious and unavoidable disruption such that they do not reach their usual demonstrated performance level

Non-Attendance for On-Campus Sessions: Students unable to attend part of an on-campus session or the final exam due to illness or other extenuating circumstances must fill in a Disruption to Studies online form and provide formal documentary evidence (a Professional Authority Form) as soon as possible AND contact Mrs Maree Nelson. Please note while missing one day of an on-campus session with appropriate formal documentation supplied is allowed, if the first on-campus session is missed completely then a withdrawal from the unit is required. Contact Mrs Nelson immediately if you miss two or more on-campus days due to illness or other extenuating circumstances. The intensive nature of the on-campus sessions and significant level of assessment during these sessions means that such non-attendance can significantly impact on progress.

For students who do have a valid reason for the non-attendance (via special consideration formally approved by the unit coordinator), if one laboratory class is missed, you will get an average mark of your other laboratory reports. If more than one laboratory class is missed you must speak to Mrs Nelson to discuss alternative options. If the mid-term exam is missed, there will be no make up exam. If the mid-semester test is missed due to medical or other valid reason, your final exam mark will be used for the missed mid-term mark (i.e. final exam mark will be out of 70%). If the final exam is missed due to a valid reason a Supplementary Examination can be granted. If a Supplementary Examination is granted, the examination will be scheduled after the conclusion of the official examination period. The offer of a supplementary examination is at the discretion of the academic staff and you should not assume that it will be provided. Supplementary Examinations are not make-up exams, i.e., a poor result in the final examination is not reason to request a supplementary examination. Please note that if you are sick at or in the days just prior to the scheduled exam time you should contact the unit coordinator as soon as possible to discuss the possibility of a supplementary exam. It is normally unwise to sit an exam if illness or other circumstances will significantly affect your performance.

If an absence is anticipated (perhaps for a mandatory religious or University associated sporting event) you must inform the unit convenor in advance that this will be the case and discuss alternative arrangements. It is your responsibility to undertake this. Notification after the event of an anticipated absence will not be looked upon favourably. For any unjustified absences students will receive a zero
mark for the assessment task. Insufficient progress in the unit as evidenced by missing laboratory classes and tests could be grounds for withdrawal.

UNIVERSITY POLICY ON ASSESSMENT

The University considers that assessment “of student learning performance and feedback on progress are pivotal and important processes in University learning and teaching. Assessment tasks communicate to students what must be learned and are vehicles by which the University assures itself, and society, of its graduates’ capabilities” and is based on the “premise that it is important that through assessment students are encouraged to engage in their education, rather than merely pursue grades. Student engagement is best facilitated by learner managed learning in which students are active partners in the process through undertaking challenging responsibilities and making choices.” There are responsibilities and rights for both staff and students in respect to assessment. These include, but are not limited to, the right of academic staff to require that students:

• be focused on learning rather than merely the achievement of grades;
• make the effort to be informed of the rules and requirements for progression in their degree program;
• get assistance from the department, faculty and/or institution if they so require it;
• behave ethically and responsibly in their conduct of assessment tasks;
• engage in critical self evaluation in terms of their progress towards the espoused learning expectations;
• submit work on time that is their own except when shared ownership is part of the task;
• notify their lecturers as soon as possible if difficulties arise with timing, online access, availability of resources or other requirements of the task;

Students have a right to:

• be informed about all aspects of assessment policy and practices in each unit of study including criteria, standards and procedures to be met and penalties for breaches;
• have consistent application of policies, procedures and penalties;
• timely return of results with feedback to enable improved performance;
• information that allows them to calibrate their own performance against the expected performance standards;

The full statements on the Assessment Policy, Guidelines and Procedure 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. Penalties may include a deduction of marks, failure in the unit, and/or referral to the University Discipline Committee.

Examples of dishonest academic behaviours are:

**Plagiarism:** Using the work or ideas of another person and presenting this as your own without clear acknowledgement of the source of the work or ideas. This includes, but is not limited to, any of the following acts:

a) copying out part(s) of any document or audio-visual material or computer code or website content without indicating their origins
b) using or extracting another person’s concepts, experimental results, or conclusions
c) summarising another person’s work
d) submitting substantially the same final version of any material as another student in an assignment where there was collaborative preparatory work
e) use of others (paid or otherwise) to conceive, research or write material submitted for assessment
f) submitting the same or substantially the same piece of work for two different tasks (self-plagiarism).

**Deception:** includes, but is not limited to, false indication of group contribution, false indication of assignment submission, collusion, submission of a work previously submitted, creating a new article out of an existing article by rewriting/reusing it, using the same data to form the same arguments and conclusion, presenting collaborative work as one’s own without acknowledging others’ contributions, cheating in an examination or using others to write material for examination.

**Fabrication:** includes, but is not limited to, creating fictitious clinical data, citation(s), or referee reports.

**Sabotagey:** includes, but is not limited to, theft of work, destruction of library materials.

Assignments are to be your own work. Using someone else’s words (either another student’s or from a book or journal article or a web site) without clear acknowledgement is plagiarism and can incur serious penalties. If it is ever necessary to use someone else’s words for a phrase or sentence, they should be placed in quotation marks and acknowledged at the end of the sentence. If you use or modify a diagram or figure from another author, that must be acknowledged underneath. Lecturers want to read your own words and ideas.

In the event that a Lecturer identifies a case of academic dishonesty, the student will be advised, either on the submitted work or by a separate letter, and a record kept in the Faculty office. Students will always have the opportunity to discuss each case with their Lecturer if they indicate they wish to do so by either contacting the Lecturer or the Head of Department. Proven cases of academic dishonesty may result in the immediate award of an “F” grade.
STUDENT SUPPORT SERVICES
Macquarie University provides a range of Student Support Services. Some examples are Health and Wellbeing, Learning Skills (includes essay writing, presentation skills and preparation for exams), library tours and IT training. Details of these services can be accessed at http://students.mq.edu.au/support/

Numeracy Centre
Students, who need help with revision of basic mathematical concepts required in this unit, can receive remedial assistance from the Numeracy Centre on campus. Topics such as simple proportions, logarithms and manipulation of simple equations are examples of topics offered by the Centre. Contact the Numeracy Centre (C5A 225) on 9850 8924 or visit http://maths.mq.edu.au/numeracy/.

CHANGES TO THE UNIT SINCE LAST OFFERING
Online quizzes have been replaced by in-class quizzes.

FEEDBACK
We are always open to suggestions for improving the content and delivery of this course. We are very happy to receive any constructive criticism that you may wish to provide. We hope you find this course educational, useful and fascinating!
Maree Nelson
UNIT SYLLABUS, TIMETABLE AND STUDY PLAN

In the weeks prior to each on-campus session you should read the corresponding chapters in the textbook and attempt the set tutorial problems from the end of the chapter in the textbook (also available on the web). A study plan is provided at the end of this document to assist you. A selection of the set tutorial problems below will be discussed in the on-campus sessions. Additionally, if in your preparation you find that there are areas that you need further help on, you should provide the details to the lecturer in charge of the relevant on-campus session (preferably BEFORE the on-campus session) by email so the lecturer can also address these issues with the class (if you are having difficulties it is probable that other students will also have similar difficulties).

On-Campus Session 1 Day 1 (16th August)

9-10.30 am (E6A133)
Lecture: chapters 1, 2 and 3 (excluding 3.8-3.12), 4 and 5.
Tutorial Problems: sets 1, 2 (see attached sheet with ‘Tutorial Schedule’).

10.30-10.45 am (balcony E7B level 3)
Morning tea

10.45 am-1 pm (E6A133)
Lecture: chapter 7: chemical reactions.
Tutorial Problems: set 3 (see attached sheet with ‘Tutorial Schedule’).

1-1.30 pm
Lunch break

1.30-4.30 pm (E7B 308 entry off balcony level 3)
Laboratory: Experiment 1, Physical and Chemical Changes. Have pre-lab for Experiment 1 (E1) ready for submission at 1.30pm to your demonstrator.

On-Campus Session 1 Day 2 (17th August)

9-10.30 am (E6A133)
Lecture: chapter 13 1-5, Solutions; chapter 6, Chemical Composition.

10.30-10.45 am (balcony E7B level 3)
Morning tea

10.45 am-1 pm (E6A133)
Lecture: chapter 8, Reaction Stoichiometry; chapter 13.6-13.8, Molarity and Solution Stoichiometry
Tutorial problems: set 5.

1-1.30 pm
Lunch break

1.30-4.30 pm (E7B 308 entry off balcony level 3)
Laboratory: Experiment 2, Separations and Purifications; Precipitation Reactions.
Have pre-lab for E2 ready for submission at 1.30 pm to your demonstrator.

**On-Campus Session 2 Day 1 (26 September)**

9-10.30 am (E6A133)  
**Lecture:** chapter 9, Atoms, Orbitals and Electron Configuration.  
**Tutorial Problems:** set 6.

10.30-10.45 am (balcony E7B level 3)  
Morning tea

10.45 am-1 pm (E6A133)  
**Lecture:** chapter 11, Gases.  
**Tutorial Problems:** chapter11 problems from set 7.

1-1.30 pm  
Lunch break

1.30-4.30 pm (E7B 308 entry off balcony level 3)  
**Laboratory:** Experiment 3, Stoichiometry. Have pre-lab for Experiment 3 (E3) ready for submission at 1.30pm to your demonstrator.

**On-Campus Session 2 Day 2 (27 September)**

9-10.30 am (E6A133)  
**Lecture:** chapter 10, Chemical Bonding.  
**Tutorial Problems:** chapter 10 problems from set 7.

10.30-10.45 am (balcony E7B level 3)  
Morning tea

10.45 am-1 pm (E6A133)  
**Lecture:** chapter 12, Intermolecular Forces.  
**Tutorial Problems:** set 8.

1-1.30 pm  
Lunch break

1.30-4.30 pm (E7B 308 entry off balcony level 3)  
**Laboratory:** Experiment 4, Acid-Base Stoichiometry. Have pre-lab for Experiment 4 (E4) ready for submission at 1.30pm to your demonstrator.

**On-Campus Session 2 Day 3 (28th September)**

9-10.30 am (E6A133)  
**Lecture:** Energy, chapter 3 3.8-3.12; chapter 8, 8.7; chapter 12, parts of 12.4, 12.5.  
**Tutorial Problems:** set 9.

10.30-10.45 am
Morning tea

10.45-12 pm (E6A 133)
Mid-semester Test (50 minutes) – Examination of material from first 3 on-campus days, up to and including chapter 11, Gases. There will be a short time before commencement of the test for questions and answers.

12 pm
End of second on-campus session.

On-Campus Session 3 Day 1 (25 October)

9-10.30 am (E7B264)
Lecture: chapters 14, Acids and Bases
Tutorial Problems: set 10, (see attached sheet with ‘Tutorial Schedule’).

10.30-10.45 am (balcony E7B level 3)
Morning tea

10.45 am -1 pm (E7B264)
Lecture: chapter 15: Chemical Equilibrium
Tutorial Problems: set 10 continued, (see attached sheet with ‘Tutorial Schedule’).

1-1.30 pm
Lunch break

1.30-4.30 pm (E7B 308 entry off balcony level 3)
Laboratory: Experiment 5, Calorimetry; Heats of Reaction. Have pre-lab for Experiment 5 (E5) ready for submission at 1.30 pm to your demonstrator.

On-Campus Session 3 Day 2 (26 October)

9-10.30 am (E6A133)
Lecture: chapters 16, Oxidation and Reduction
Tutorial Problems: set 11, (see attached sheet with ‘Tutorial Schedule’).

10.30-10.45 am (balcony E7B level 3)
Morning tea

10.45 am -1 pm (E6A133)
Lecture: chapter 18: Organic Chemistry
Tutorial Problems: set 12, (see attached sheet with ‘Tutorial Schedule’).

1-1.30 pm
Lunch break

1.30-4.30 pm (E7B 308 entry off balcony level 3)
Laboratory: Experiment 6, Equilibrium; Redox reactions; Models of organic Molecules. Have pre-lab for Experiment 6 (E6) ready for submission at 1.30 pm to your demonstrator.

To-Do Lists Before Residential Sessions

Before First On-Campus Session

1. Carefully read the whole of these notes
2. Buy the textbook
3. Read Tro Chapters 1, 2, 3.1-3.7, 4, 5 and 7 and attempt as many practice and set problems as possible
4. Read Laboratory Introduction notes, E1 and E2
5. Complete pre-lab work for E1 and E2
6. Purchase a lab coat if you don’t already have one

Before Second On-Campus Session

1. Carefully read these notes again
2. Study Chapters 6, 8, 9, 11, 10, 12 and parts of 13
3. Attempt the allocated tutorial problems. Make notes on any difficulties you encounter for discussion during the on-campus workshops.
4. Read E3 and E4
5. Complete pre-lab work for E3 and E4. Look at relevant ‘lecture’ notes and Chapters 6, 7, 8 and 13 to assist
6. Download, print and attempt some past mid-semester tests

Before Third On-Campus Session

1. Study Chapters 14, 15, 16 and 18 of the text book and attempt allocated tutorial problems
2. Make notes on any difficulties you encounter for discussion during the on-campus workshop
3. Read E5 and E6. Do pre-lab for both experiments.
4. Start revising all topics
As a three credit point subject CBMS101 requires an average of 9 hours per week contact and study time. In the non on-campus weeks, ~5 - 7 hours/week of study time would be typical. It is important that you do get into a regular study pattern for this unit and don’t try to cram in the days just prior to the on-campus session or final exam. Try to establish regular study periods and adhere to them strictly. Follow all the usual recommendations for establishing sound study habits, i.e., have your own desk or table; always sit in the same place; when it is “study time”, sit down at your desk even if you don’t feel inclined to do so. **Attempting the problems at the end of each chapter without looking at the solutions first will be essential for you to self-assess if you have really understood the material.** Contact Maree Nelson as soon as you feel that you are struggling so that we can provide advice before it is too late.

<table>
<thead>
<tr>
<th>Week</th>
<th>Week Starting</th>
<th>Study Tasks</th>
</tr>
</thead>
</table>
| 1    | 4 August      | Read chapters 1-5 of the text book, Tro, using the lecture slides as a summary of the key points. Attempt as many of the recommended tutorial problems as possible.  
Note any “problem areas” you have to Maree Nelson (preferably beforehand) for discussion at the first on-campus session.  
Read the laboratory notes for Experiment 1. Do pre-lab for E1. |
| 2    | 11 Aug        | Read chapters 6-8 of the text book, using the lecture slides as a summary of the key points. Attempt as many of the recommended tutorial problems as possible.  
Note any “problem areas” to Maree Nelson for the first on-campus session.  
Read E2 and do pre-lab for E2. |
| 3    | 18 Aug        | An enormous amount of material was covered in the first on-campus session so take some time going over it. It is very important you come to grips with this material **NOW** as it will be essential for the proper understanding of material to come.  
Note any “problem areas” to Maree Nelson for the second on-campus session. |
| 4    | 25 Aug        | Study chapter 9 and attempt the related tutorial problems.  
Note any “problem areas” to Maree Nelson for the second on-campus session. |
| 5    | 1 Sept        | Read chapter 11 (gases) and attempt related tutorial problems.  
Note any “problem areas” to Maree Nelson for the second on-campus. |
<table>
<thead>
<tr>
<th>Week</th>
<th>Week Starting</th>
<th>Study Tasks</th>
</tr>
</thead>
</table>
| 6    | 8 Sept        | Read chapter 10 (chemical bonding) and attempt the related tutorial problems.  

Note any “problem areas” to Maree Nelson for the second on-campus session. |
| 7    | 15 Sept       | Read chapter 12 (intermolecular forces) and attempt the related tutorial problems.  

To prepare for the mid semester exam revise the topics up to and including gases; attempt tutorial problems and past mid term tests that are available on iLearn.  

Note any “problem areas” to Maree Nelson for the second on-campus session. |
|      | 22 Sept       | Continue to revise material for the mid term test.  

Read relevant parts of chapters on energy (3.8-3.12, 8.7, 12.4-12.5) and attempt the related tutorial problems.  

Read through Experiments 3 and 4 and the relevant parts of text book.  
Do prelab for E3 and E4.  

Note any “problem areas” to Maree Nelson for the second on-campus session. |
|      | 26-28 Sept    | **26-28 September: On-Campus Session 2. Mid Semester Exam on 28**  

29 Sept  
Take some time to review what was covered during the on-campus session 2. Look at the What You Need to Know Sheet on the web site as a guide.  

Read the relevant sections of chapter 14, Acids and Bases and attempt the recommended tutorial.  

Note any “problem areas” to Maree Nelson for the third on-campus session. |
| 8    | 6 Oct         | Read the relevant sections of chapter 15, Chemical Equilibrium and attempt the recommended tutorial problems.  

Note any “problem areas” to Maree Nelson for the third on-campus session. |
| 9    | 13 Oct        | Read the relevant sections of chapter 16, Electrochemistry and attempt the recommended tutorial problems.  

Note any “problem areas” to Maree Nelson for the third on-campus session. |
| 10   | 20 Oct        | Read the relevant sections of chapter 18, Organic Chemistry and attempt the recommended tutorial problems.  

Note any “problem areas” to Maree Nelson for the third on-campus session. |
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<thead>
<tr>
<th>Week</th>
<th>Week Starting</th>
<th>Study Tasks</th>
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</thead>
<tbody>
<tr>
<td>11</td>
<td>27 Oct</td>
<td>Take some time to review what was covered during the on-campus session 3. Start to revise all material. Look at the tutorial problems assigned previously and past exam questions to guide you. Ask questions!</td>
</tr>
<tr>
<td>12,13</td>
<td>3 Nov onwards</td>
<td>Revise all material and go through past exams and problems from the textbook. Ask questions!</td>
</tr>
</tbody>
</table>
Syllabus

CBMS101X Foundations of Chemistry 2014


The Chemical World

Measurement and Problem Solving

Matter
Sections 3.1-3.7 presented in on-campus session 1, sections 3.8-3.12 presented in on-campus session 2.

Atoms and Elements
Atomic Theory
The Nuclear Atom
Properties of Protons, Neutrons and Electrons
Elements Defined by Number of Protons
Periodic Law and Periodic Table
Ions
Isotopes
Atomic Mass

Molecules and Compounds

Constant Composition of Compounds
Chemical Formulae
Elements and Compounds
Naming Compounds

Chemical Composition

Mass and Moles
Mass Percent Composition
Calculating Empirical Formulae
Calculating Molecular Formulae

Chemical Reactions

Chemical Equations
Solubility
Precipitation Reactions
Acid-Base and Gas Evolution Reactions
Oxidation-Reduction Reactions

Quantities in Chemical Reactions
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<th>Chapter</th>
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<td>Mass to Mass Conversions</td>
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<td>Limiting Reactant, Percent Yield, Theoretical Yield</td>
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<td>Enthalpy</td>
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<td><strong>Electrons in Atoms and the Periodic Table</strong></td>
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<tr>
<td>Electromagnetic Radiation</td>
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<td>Bohr Model</td>
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<td>Quantum-Mechanical Orbitals</td>
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<td>Electron Configurations and the Periodic Table</td>
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<td><strong>Electrochemistry</strong></td>
<td><strong>CH16</strong></td>
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<td>Definitions</td>
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<td>Oxidation States</td>
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<td>Balancing Redox Equations</td>
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<td>The Activity Series</td>
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<td>Batteries and Fuel Cells</td>
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<td>Alkanes</td>
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<td>Functional Groups</td>
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<td>Aldehydes and Ketones</td>
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<td>Carboxylic Acids and Esters</td>
<td>18.15</td>
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<tr>
<td>Amines</td>
<td>18.16</td>
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</tbody>
</table>
Tutorial Schedule

Tutorial work in CBMS101X consists of regular working through set tutorial questions after you have completed studying the relevant section of the syllabus. A selection of these tutorial problems will be worked through in the on-campus sessions. Each tutorial session will cover problems dealing with several topics. To prepare you should attempt all of the suggested problems by yourself. Some of the selected exercises have answers at the back of the textbook and the ones that don’t are paired up with similar exercises that do have answers so if you are having difficulty with a problem, attempt the similar one with the answer provided first. If you still have difficulty with any of the problems, you should ask for assistance at the tutorial class or by e-mail at any time. All tutorial questions will be put on the CBMS101X website for those without access to a textbook. All tutorial answers will be put on the web after they have been discussed in the on-campus session. The value gained from a tutorial class is greatly increased if you try the problems beforehand. It may not be possible to go through all the set tutorial problems in the time allocated so come prepared with your questions.

When you want to ask your tutor privately about a question causing difficulty, be ready to work through the problem to the point where you became stuck. Most tutors are not very impressed with the statement that you "could not get started" on a problem. While the statement may occasionally be true, more often it is an indication that the person making it has not tried to find an example exercise. The textbook contains a large number of worked examples and students should be able to find example exercises as an initial guidance.

<table>
<thead>
<tr>
<th>Tutorial Set</th>
<th>Topic</th>
<th>Exercises</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The Chemical World; Measurement; Matter</td>
<td>2.32(a), 2.34(c), 2.46, 2.58(a, d), 2.64(b), 2.72(a), 2.82 (Consult Table 2.3) 2.98, 3.36, 3.40, 3.42, 3.48, 3.50, 3.114</td>
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<tr>
<td>2</td>
<td>Atoms and Elements; Molecules and Compounds</td>
<td>4.66, 4.80, 4.94, 4.96, 4.100, 4.108, 5.10, 5.26, 5.34, 5.52, 5.64, 5.70</td>
</tr>
<tr>
<td></td>
<td>Topics</td>
<td>Pages</td>
</tr>
<tr>
<td>---</td>
<td>---------------------------------------------</td>
<td>--------------------------------</td>
</tr>
<tr>
<td>3</td>
<td>Chemical Reactions</td>
<td>7.26, 7.36, 7.42, 7.52, 7.60, 7.64, 7.72(a,b), 7.78, 7.82(a,c), 7.84, 7.94, 7.106</td>
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<tr>
<td>4</td>
<td>Solutions; Chemical Composition; Stoichiometry</td>
<td>13.32, 13.34, 13.36(a), 13.44, 13.54, 6.22, 6.36, 6.42, 6.68, 6.76, 6.84, 6.86, 6.98</td>
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<tr>
<td>5</td>
<td>Reaction Stoichiometry</td>
<td>8.16, 8.22(a,c), 8.30, 8.32(a), 8.42, 8.46(c,d), 8.58(b), 8.64 13.62(a,c), 13.76, 13.90(a), 14.52(a), 14.56</td>
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<tr>
<td>6</td>
<td>Electrons in atoms and Periodic Table</td>
<td>9.34, 9.50, 9.54, 9.58(b-d), 9.74, 9.80, 9.84, 9.94, 9.98</td>
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<tr>
<td>7</td>
<td>Gases; Chemical Bonding</td>
<td>11.36, 11.40, 11.48, 11.62, 11.80, 11.86(b), 11.92, 10.24, 10.32, 10.40, 10.50, 10.60, 10.66, 10.82, 10.90, 10.115</td>
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<td>8</td>
<td>Intermolecular Forces</td>
<td>12.60, 12.64, 12.66, 12.76, 12.82, 12.92</td>
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<td>9</td>
<td>Energy</td>
<td>3.64, 3.76, 3.82, 3.86, 8.72, 8.74, 8.76, 12.50, 12.54, 12.56</td>
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<tr>
<td>10</td>
<td>Acids and Bases; Chemical Equilibrium;</td>
<td>14.36(a,b,c), 14.40(c,d), 14.42(a,d), 14.44(a,b), 14.60(b,c), 14.64(b,c), 14.70(a,d), 14.78(a,b), 14.82(a,b), 14.125, 15.40, 15.46(a,c), 15.50(a-c), 15.76</td>
</tr>
<tr>
<td>11</td>
<td>Oxidation and Reduction</td>
<td>16.44, 16.58(a,d), 16.66(c), 16.78, 16.86</td>
</tr>
<tr>
<td>12</td>
<td>Organic Chemistry</td>
<td>18.40, 18.46(a-c), 18.56(a-c), 18.69, 18.72, 18.86, 18.90(a,b)</td>
</tr>
</tbody>
</table>
### LIST OF ANIONS / CATION AND EXAMPLES OF TYPICAL SALTS

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<th>Name of anion</th>
<th>Symbol</th>
<th>Typical salt</th>
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<td>F^-</td>
<td>CaF$_2$</td>
</tr>
<tr>
<td>Chloride</td>
<td>Cl^-</td>
<td>NaCl</td>
</tr>
<tr>
<td>Bromide</td>
<td>Br^-</td>
<td>KBr</td>
</tr>
<tr>
<td>Iodide</td>
<td>I^-</td>
<td>AgI</td>
</tr>
<tr>
<td>Chromate</td>
<td>CrO$_4^{2-}$</td>
<td>Na$_2$CrO$_4$</td>
</tr>
<tr>
<td>Dichromate</td>
<td>Cr$_2$O$_7^{2-}$</td>
<td>Na$_2$Cr$_2$O$_7$</td>
</tr>
<tr>
<td>Sulfate</td>
<td>SO$_4^{2-}$</td>
<td>K$_2$SO$_4$</td>
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<td>Hydrogen sulfate</td>
<td>HSO$_4^-$</td>
<td>KHSO$_4$</td>
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<tr>
<td>Sulfite</td>
<td>SO$_3^{2-}$</td>
<td>Na$_2$SO$_3$</td>
</tr>
<tr>
<td>Hydrogen sulfite</td>
<td>HSO$_3^-$</td>
<td>NaHSO$_3$</td>
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<tr>
<td>Sulfide</td>
<td>S$_2^-$</td>
<td>ZnS</td>
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<td>Hydrogen sulfide</td>
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<td>Hydrogen carbonate</td>
<td>HCO$_3^-$</td>
<td>NaHCO$_3$</td>
</tr>
<tr>
<td>Phosphate</td>
<td>PO$_4^{3-}$</td>
<td>K$_3$PO$_4$</td>
</tr>
<tr>
<td>Acetate</td>
<td>CH$_3$COO^- or C$_2$H$_3$O$_2^-$</td>
<td>Ag(CH$_3$COO)</td>
</tr>
<tr>
<td>Cyanide</td>
<td>CN^-</td>
<td>KCN</td>
</tr>
<tr>
<td>Hydroxide</td>
<td>OH^-</td>
<td>NaOH</td>
</tr>
<tr>
<td>Oxide</td>
<td>O$_2^-$</td>
<td>CaO</td>
</tr>
<tr>
<td>Perchlorate</td>
<td>ClO$_4^-$</td>
<td>KClO$_4$</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name of cation:</th>
<th>Symbol</th>
<th>Typical salt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ammonium</td>
<td>NH$_4^+$</td>
<td>NH$_4$Cl</td>
</tr>
</tbody>
</table>

### Acids and Bases Encountered in CBMS101:

<table>
<thead>
<tr>
<th>Acids</th>
<th>Bases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weak</td>
<td>Strong</td>
</tr>
<tr>
<td>Most others</td>
<td>HCl</td>
</tr>
<tr>
<td></td>
<td>HBr</td>
</tr>
<tr>
<td></td>
<td>H$_2$SO$_4$</td>
</tr>
<tr>
<td></td>
<td>HClO$_4$</td>
</tr>
</tbody>
</table>

Ref: Table2012.doc