# 2021 CHEMISTRY BRIDGING COURSE

| | 9-10.30 am | 11am-12.30pm | Lunch | 1.30-2.45pm | 3-5pm |
|---|---|---|---|---|---|
| **Wednesday 3rd February** | Lecture 1 (ME) | Lecture 2 (ME) | | Lecture 3 (ME) | Workshop on lectures 1-3 |
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| **Thursday 4th February** | Lecture 4 (MLT) | Lecture 5 (MLT) | | Lecture 6 (MLT) | Lab: Introduction **(3-5.30 pm)** |
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| **Friday 5th February** | Workshop on Lectures 4-6 | Lecture 7 (MLT) | | Lecture 8 (SW) | Lab: Acid-base titration **(3-5.30 pm)** |
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| **Monday 8th February** | Workshop on Lectures 7-8 | Lecture 9 (SW) | | Lecture 10 (HB) | Lab: Precipitation Reactions **(3-5.30 pm)** |
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| **Tuesday 9th February** | Workshop on Lectures 9-10 | Lecture 11 (HB) | Liquid nitrogen ice cream | Lecture 12 (HB) | Lecture 12 continued if needed **Finish: 4.30 pm** |
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| **Wednesday 10th February** | Workshop on Lectures 11-12 | Lecture 13 (HB) | | Lecture 14 (HB) | Lecture 15 (HB) **Finish: 4.30 pm** |
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| **Thursday 11th February** | Workshop on Lectures 13-15 | Lecture 16 (LW) | | Lab: Electron Transfer Reactions | |
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| **Friday 12th February** | Lecture 17 (LW) | Workshop on Lectures 16-17 | BBQ lunch with Department & certificates | FREE | FREE |

**Lecturers:**

(HB): Harrison Barnett, Harrison.Barnett@anu.edu.au (ME): Mark Ellison, Mark.Ellison@anu.edu.au (LW): Lachlan.Watson@anu.edu.au
(MLT): Ming Li Tan, Mingli.Tan@anu.edu.au (SW): Steven Welsh, Steven.Welsh@anu.edu.au

**Lab demonstrators**: Andie Delaney, Jacob McMullen, Gareth Nelmes, Izzy Palombi, Flynn Attard, Jess Algar and Sebastian Palombi

**A formal pre-lab will be given prior to each laboratory session.**

| Lecture | Topics | Learning Outcomes |
|---|---|---|
| 1 | *Classification of matter (BLB 1.2)<br>*Chemical Foundation: elements, atoms and ions (BLB 2.6-2.7)<br>*Atomic structure (BLB 2.1-2.3) | *To understand the properties of matter and the definitions of elements, atoms and ions.<br>*To learn about the internal workings of an atom. |
| 2 | *Introduction to the periodic table (BLB 2.5) | *To be able to read the periodic table and understand the basis of the information presented.<br>*To understand the features of the periodic table including the ability to predict the properties of elements in the table. |
| 3 | *Naming of (BLB 2.8) binary ionic compounds and binary compounds containing non-metals | *To be able to name binary compounds and compounds that contain polyatomic ions.<br>*To be able to write formulas form names and vice versa |
| Lab 1 | *Equipment<br>*Glassware<br>*Safety | *Identifying equipment and glassware in the laboratory<br>*Safe handing procedures |
| 4-6 | *Information given by a chemical equation (BLB 3.6)<br>*Chemical Composition<br>*The mole and stoichiometry [DVD] (BLB 3.4)<br>*Molarity (BLB 4.5)<br>*Chemical reactions<br>*Chemical equations and the balancing act (BLB 3.1.3.2)<br>*Dilution (BLB page 128) | *To understand these concepts and to apply them to the calculation of reaction yields and analytical measurements.<br>*To learn to identify the characteristics of a chemical reaction and the information given by a chemical reaction.<br>*To be able to write and balance a chemical equation. |
| 7 | *Limiting reagents in reactions (BLB 3.7)<br>*Yields of reactions (BLB 3.7) | *To understand how to predict the products of chemical reactions |
| 8-9 | *Acids and bases (BLB 4.3 and 17.1-17.5) | *To understand the concepts of acids and bases.<br>*To be able to calculate pH. |
| Lab 2 | *Acid base titrations (BLB 4.6) | *To develop manipulations skills useful to chemistry<br>*Practice balancing of equations and use of units |

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| Lab 3 | *Precipitation Reactions (A pre-lab will be given) | *To use the solubility rules to predict the products of reactions<br>*To practice balancing equations |
| 10-12 | *Modern atomic theory (BLB 6.1, 6.2, 6.4-6.9)<br>*Ionic and covalent bonds (BLB 8.2-8.3)<br>*Electronegativity and bond dipoles (BLB 8.4)<br>*Lewis structures (BLB 8.5) | *To be familiar with each model of the atom.<br>*To understand electron configuration<br>*To understand the different types of chemical bonds. |
| Lab 4 | * Electron Transfer reactions | *To apply theory used to practical application |
| 13-15 | *Oxidation and reduction reactions<br>(BLB 4.4, 19.1-19.4) | *To understand the concepts of oxidation and reduction |
| 16-17 | *Introductory organic chemistry<br>(BLB 22.1-22.7) | *To be able to draw and name simple organic structures. |

References refer to
Brown, Lemay, Bursten *et al*., *Chemistry: The Central Science* 3rd Ed., Pearson 2014
The text book is available as an ebook and as a hard copy. Both the ebook and the hardcopy can be purchased from the Pearson web page:
http://www.pearson.com.au/9781442554603

This text forms the basis of both Chemistry 1 and 2, and many of the examples, illustrations, and exercises used will be taken directly from them. It should be used extensively and intelligently to support and enhance your understanding of the subject.

A set of lectures notes and a lab manual will be issued at the first lecture.

**Lectures:** STB S1
**Tutorials:** STB S1, Hancock Building 2.22, 2.23, 2.25, 2.27 and 2.28 and Research School of Chemistry Room 3.104 and the Drop in Centre.
**Labs:** STB level 2 labs

**STB: Science Teaching Building, 136 (Red Building)**