



THE GRIMWADE CENTRE FOR CULTURAL MATERIALS CONSERVATION
SCHOOL OF HISTORICAL & PHILOSOPHICAL STUDIES
FACULTY OF ARTS
THE UNIVERSITY OF MELBOURNE

Chemistry Bridging Course, 25-29 January 2021 (1-week intensive)
Course fee: \$1,490.00 (GST inclusive)

INFORMATION SHEET

The Chemistry Bridging Course has been designed for students entering the MA (Cultural Material Conservation) program who have limited knowledge of chemistry, or, students who wish to increase or revise their chemistry knowledge.

The intensive course provides:

- A preparation package, allowing students to read concepts and start practicing problems, thus enabling more learning during the intensive course.
- Lectures, which introduce fundamental chemical concepts like atomic structure, bonding, analysis techniques, acid/base chemistry, spectroscopy, inorganic and organic chemistry.
- Tutorial sessions where students solve exercises/problems under the guidance of a tutor. The aim is for students to become comfortable with scientific notation, the naming of compounds, measurement, chemical calculations and common chemical reactions.
- Practical laboratory work, exposing students to common laboratory techniques and instrumentation, illustrating theoretical concepts covered in lectures.

Dates

The course is taught in a 1-week block, starting Monday January 25 and concluding Friday January 29, 2021. Classes will be held **Monday to Friday** (excluding 26 January), from 9 am to 5 pm.

Format

The course consists of lectures, tutorials and laboratory sessions. Lectures and some tutorials will be provided online. Wednesday will be devoted to tutorials. Monday, Tuesday, Thursday and Friday will be devoted to laboratory work, which will include:

- Experiments which illustrate and apply theoretical concepts
- Calculations involved with preparing solutions and analysing results
- An introduction to instrumentation and spectroscopic methods.

Facilities and resources

Lectures will be provided online. Tutorial and practical sessions will be held at the Centre for Cultural Materials Conservation at the University of Melbourne.

Texts

There are many general chemistry texts that would be suitable references for this course.

- The following text is required for the MA course, and so would be a sensible purchase at this time: **Zumdahl, S., *Chemistry*, 4th/5th/6th/7th/8th edition.**
- A very similar, although more basic text by the same author, is Zumdahl, S., *Introductory Chemistry. A Foundation*. 5th edition.
- The UK Museums and Galleries Commission has published a basic but useful series titled: *Science for Conservators*, Volumes 1, 2, 3.

Course Outline

Day 1: General introduction.

- Atomic structure, periodic table of the elements, metals and non-metals, and types of bonding
- Laboratory safety
- Measurement and treatment of experimental data
- Stoichiometric calculations, mole concept

Day 2: Physical chemistry.

- Acid-base chemistry - pH scale, pH measurement, and buffers
- Titration of acids and bases
- Spectroscopy and the Beer-Lambert Law
- Reaction kinetics and equilibrium

Day 3: Tutorial intensive

Day 4: Inorganic Chemistry.

- Electronegativity, bonding and molecular forces
- Metals, salts and their structures
- Solubility and precipitation
- Transition metals
- Redox chemistry: galvanic cell, half cell potentials and electrolysis

Day 5: Organic Chemistry.

- Hydrocarbons, molecular models and isomers
- Functional groups and their effect on solubility and acid/base properties
- Polymers – types, methods of polymerization, properties
- Separating mixtures and methods for structure determination

Enrolment deadline: 7th & 14th December 2020

n.b. To ensure your place in the course it is in your interest to complete the 2-step enrolment process as early as possible.

- Step 1: Submit enrolment application form (due **7 December 2020**).
- Step 2: Make enrolment payment when the e-cart becomes available (due **14 December 2020**).

Detailed course preparation materials (including online lectures) will be provided, which students will work through prior to the start of the course.

For further course information,

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or visit <http://arts.unimelb.edu.au/shaps/students/graduate-coursework/chemistry-bridging-course>