



## INFORMATION SHEET

### THE CENTRE FOR CULTURAL MATERIALS CONSERVATION THE UNIVERSITY OF MELBOURNE

## Chemistry Bridging Course February 1<sup>st</sup> - February 12<sup>th</sup>, 2010

**Fee: \$990.00 (GST inclusive)**

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.

This intensive course provides:

- Preparation package that allow students to read concepts and start practicing problems. This allows students to learn more during the intensive course.
- Lectures that give an introduction to fundamental chemical concepts of 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, naming compounds, measurement, chemical calculations and common chemical reactions.
- Practical laboratory work, that expose students to common laboratory techniques and instrumentation that illustrate theoretical concepts covered in lectures.

#### *Dates*

The course is taught in a two 2-week block, starting on Monday February 1 and concluding on Friday February 12, 2010. Classes will be held on **Monday, Tuesday, Thursday and Friday**, from 10.00 a.m. to 5.00 p.m. There will be no classes on Wednesdays. Students are encouraged to use this day for review.

#### *Format*

The course consists of lectures, tutorials and laboratory sessions. Lectures and tutorials will be conducted in the morning. Each afternoon will be devoted to laboratory work, which will include:

- Experiments to illustrate and apply the theoretical concepts
- Calculations involved in preparation of solutions and analysis of results
- Introduction to instrumentation/spectroscopic methods.

#### *Facilities and resources*

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

### *Course Outline*

#### **Week 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

#### **Week 1: 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

#### **Week 2: 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

#### **Week 2: 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

### ***Enrolments deadline:***

**January 4<sup>th</sup>, 2010**

***n.b. To ensure your place in the course it is in your interest to enrol as early as possible.***

Detailed course preparation materials are provided on enrolment. You are strongly advised to work these materials thoroughly prior to the start of the course.

### *Teaching Staff:*

Dr Petronella Nel (CCMC)

For further course information, Contact: Dr Petronella Nel Tel: +61 3 8344 7989, Email: [pnel@unimelb.edu.au](mailto:pnel@unimelb.edu.au) or visit [www.culturalconservation.unimelb.edu.au/courses](http://www.culturalconservation.unimelb.edu.au/courses)