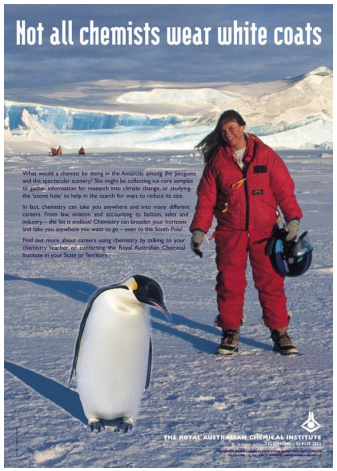
Second Year Chemistry 2014

Information Session

A/Prof Siggi Schmid

Second Year Coordinator



Key Contacts

Siggi Schmid

Second Year Coordinator

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Suzanne Kania

Assistant Administration Manager

Front Office, e-mail: suzanne.kania@sydney.edu.au

Picture a chemist…

…who do you see?


35
Br eaking
56
Ba d
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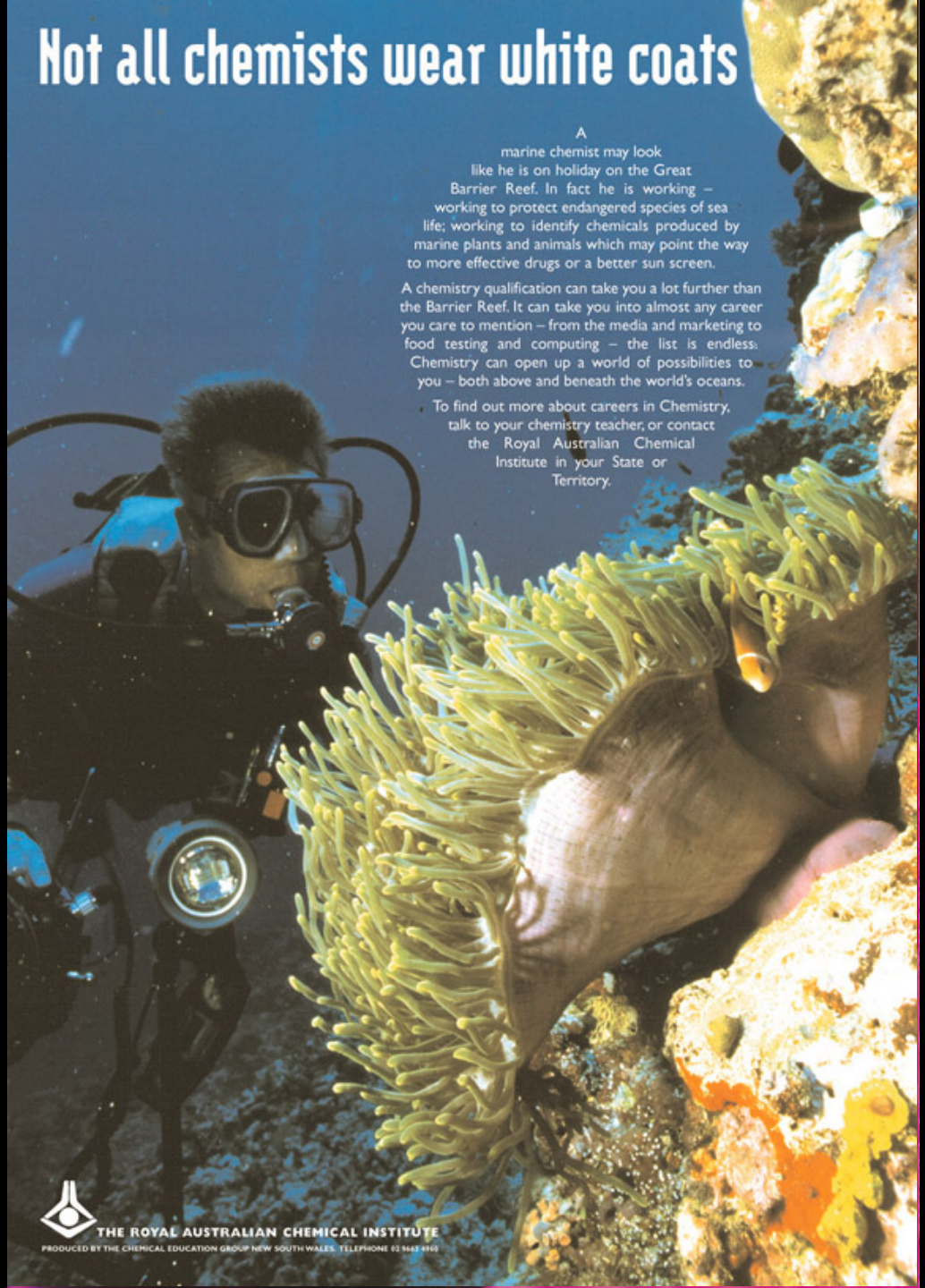
Not all chemists wear white coats



A marine chemist may look like he is on holiday on the Great Barrier Reef. In fact he is working – working to protect endangered species of sea life; working to identify chemicals produced by marine plants and animals which may point the way to more effective drugs or a better sun screen.

A chemistry qualification can take you a lot further than the Barrier Reef. It can take you into almost any career you care to mention – from the media and marketing to food testing and computing – the list is endless. Chemistry can open up a world of possibilities to you – both above and beneath the world's oceans.

To find out more about careers in Chemistry, talk to your chemistry teacher, or contact the Royal Australian Chemical Institute in your State or Territory.

THE ROYAL AUSTRALIAN CHEMICAL INSTITUTE
PRODUCED BY THE CHEMICAL EDUCATION GROUP NEW SOUTH WALES. TELEPHONE 02 9667 4961

Overview

Information Session - Second Year Chemistry

- The Central Science
- Where can you go with chemistry?
- The Bottom Line?
- CHEM2 at USyd
- Questions

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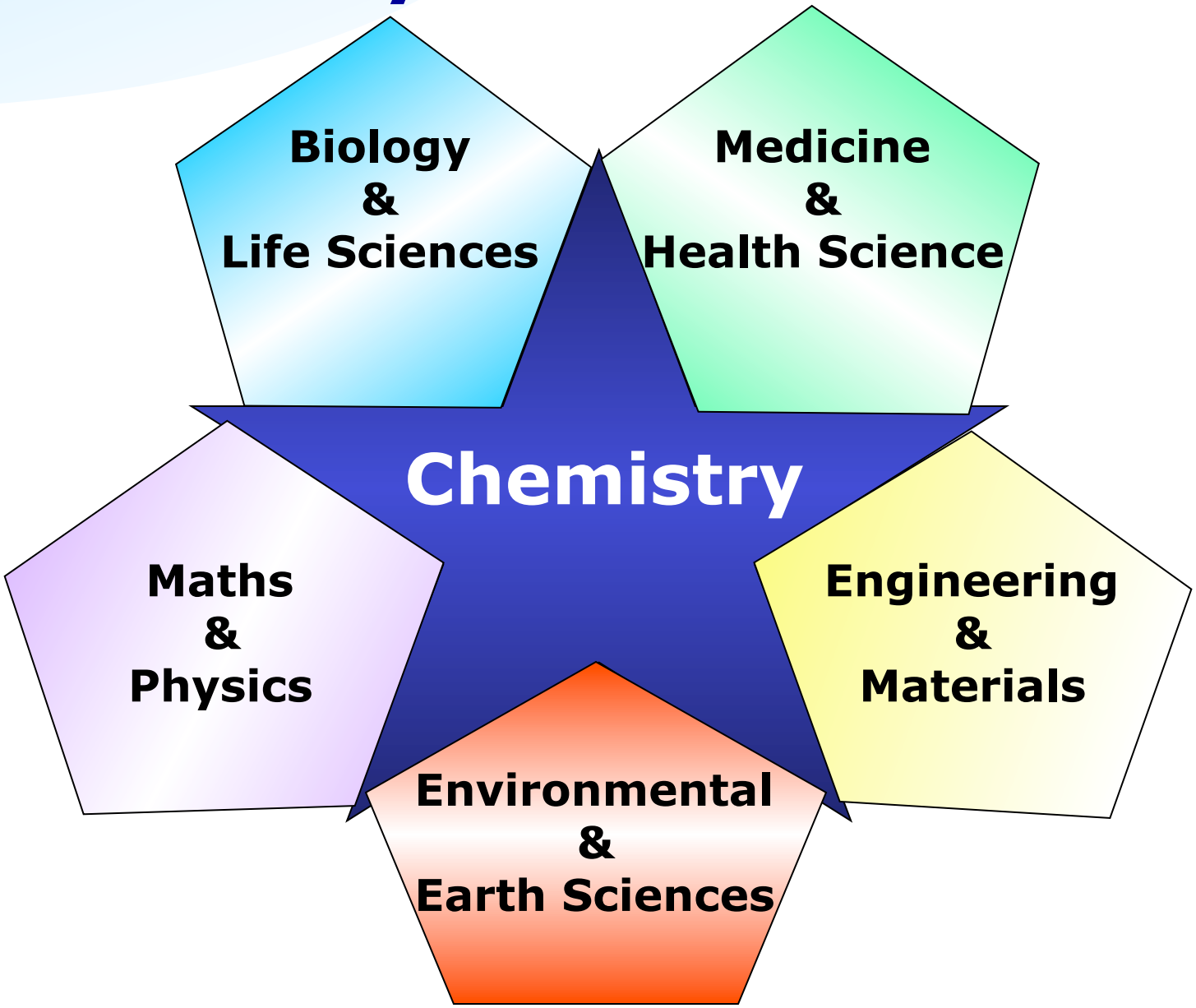
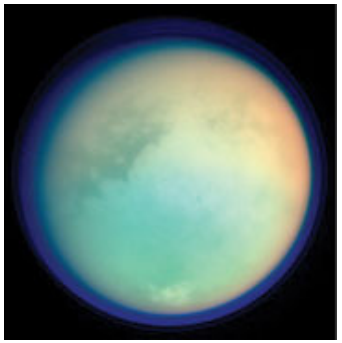
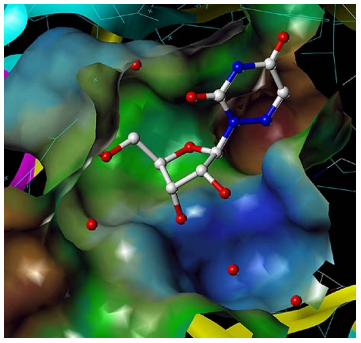
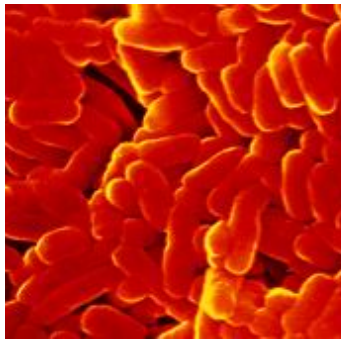
Chemistry: The Central Science



Chemistry: Burning Questions

1. How do we **treat malaria, HIV/AIDS**, **TB**, Alzheimer's …?
2. How do we **feed the world**?
3. How do we make sure everybody has enough **water to drink**?
4. Can we find better ways to **harness solar energy**?
5. What are the **new fuels** when oil runs out?
6. How do we run cars on **hydrogen**?
7. Can we develop a truly **clean, green nuclear power** option?
8. How do we make **manufacturing processes cleaner**?
9. How can we **clean up polluted lands** and waterways?

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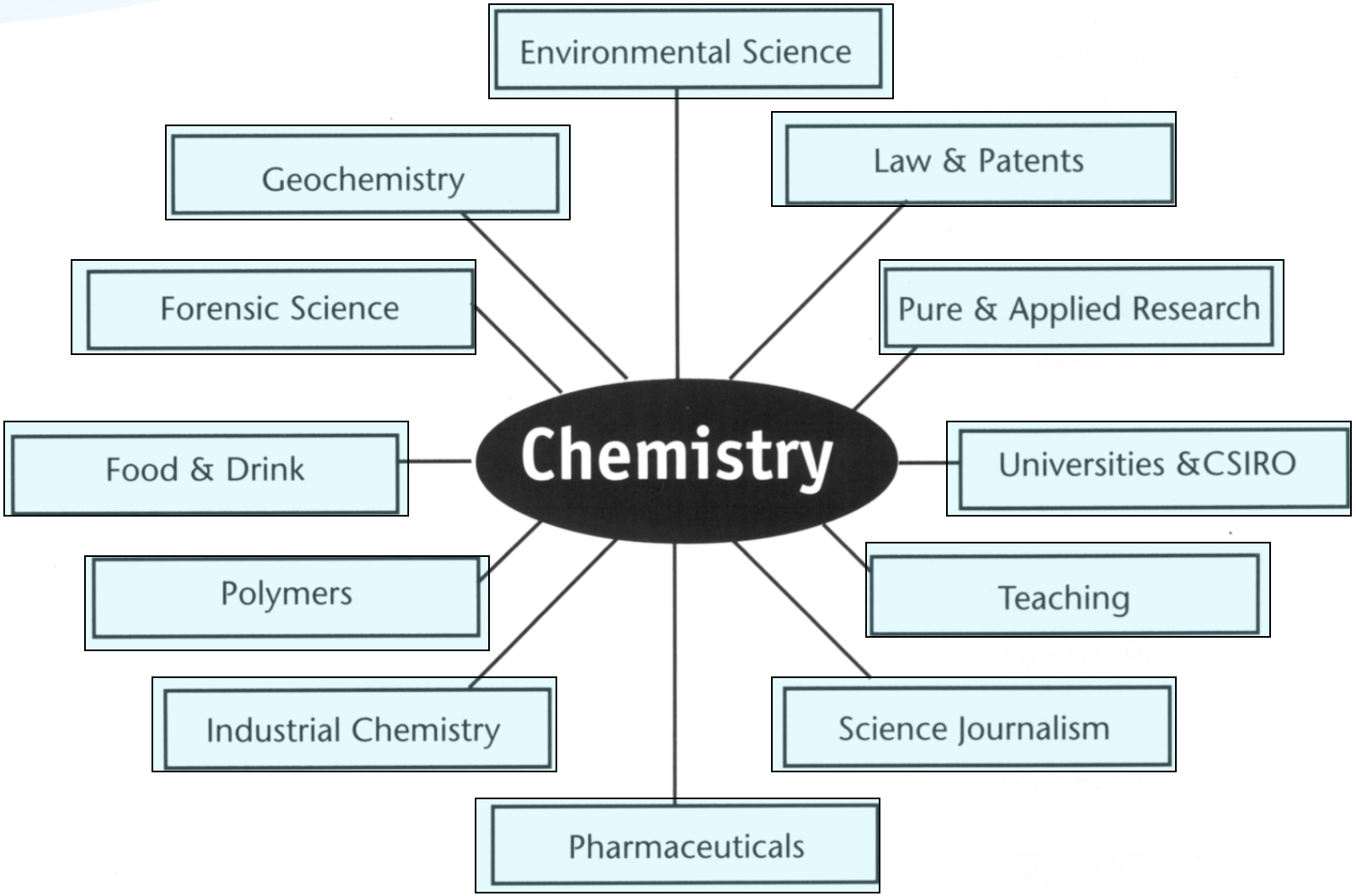
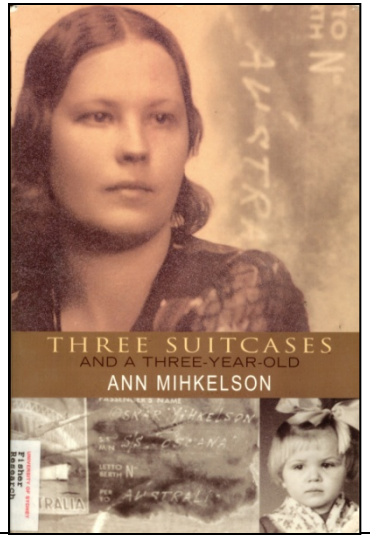
Chemistry: Where can it take you?

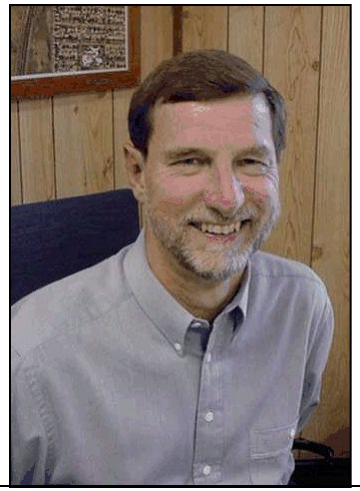


Craig Turner, PhD 2004
Senior Medicinal Chemist, Pharmaxis Ltd
(Pharmaceuticals/Drug Discovery)

Liz Barrett, BSc(Hons) 2003
Patent Attorney (Spruson & Fergusson)



Ann Mihkelson, PhD 1974
Author



George Barnett, PhD 1974
General Manager of Orica

Thomas Barlow, BSc (Hons) 1992
Government Science Advisor, Consultant & Author

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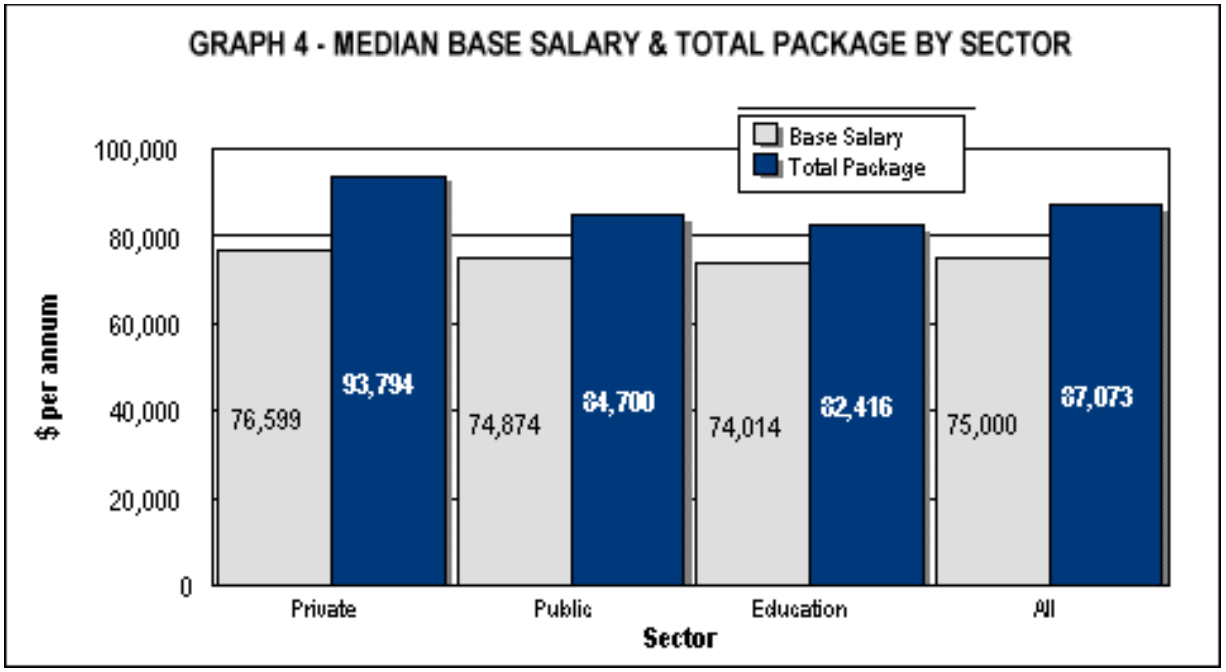
Chemistry: How much will it make you?

Graduate Careers Australia 2011

Graduate physical scientists with bachelors degrees get paid more (by the hour) than newly graduated lawyers, doctors, accountants, vets, economists, computer scientists and biologists. We're equal 6th (with mathematicians) behind dentists, optometrists, engineers and earth science.

Chemistry: How much will it make you?

Royal Australian Chemical Institute Survey 2004



Median Base Starting Salaries at 25 YO or less (2010):

BSc: $50,500 **BSc Hons:** $61,000 **PhD** $86,000

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  - Course Selection
  - Content
  - Structure & Assessment
  - Advanced, SSP & Year in Industry

CHEM2 Course Overview

Semester 1

CHEM 2401: Molecular Reactivity & Spectroscopy

CHEM 2404: Forensic & Environmental Chemistry

Semester 2

CHEM 2402: Chemical Structure & Stability

CHEM 2403: Chemistry of Biological Molecules

Four units to choose from

All 6 Credit Point units

CHEM2 Course Overview

Semester 1

CHEM 2401 Molecular Reactivity & Spectroscopy

- also CHEM2911 (Advanced) & CHEM2915 (SSP)
- **core for BSc**, elective for MBG

CHEM 2404 Forensic & Environmental Chemistry

- **elective for BSc**
- core for Chem. Eng.

CHEM2 Course Overview

Semester 2

CHEM 2402 Chemical Structure & Stability

- also CHEM2912 (Advanced) & CHEM2916 (SSP)
- **core for BSc**, elective for MBG

CHEM2403 Chemistry of Biological Molecules

- **elective for BSc**
- core for Chem. Eng. and MBG

Course Selection

BSc Students

The core units provide the mainstream chemistry essential for students planning to major in chemistry and chemical related sciences.

Minimum entry requirement for **Senior Chemistry**:

- Molecular Reactivity & Spectroscopy (2401/2911/2915)
- Chemical Structure & Stability (2402/2912/2916)

CHEM2 Course Overview

Semester 1

CHEM 2401: Molecular Reactivity & Spectroscopy

CHEM 2404: Forensic & Environmental Chemistry

Semester 2

CHEM 2402: Chemical Structure & Stability

CHEM 2403: Chemistry of Biological Molecules

All 6 Credit Point units

CHEM2 Course Overview

Semester 1

CHEM 2401: Molecular Reactivity & Spectroscopy

CHEM 2404: Forensic & Environmental Chemistry

Semester 2

CHEM 2402: Chemical Structure & Stability

CHEM 2403: Chemistry of Biological Molecules

All 6 Credit Point units

Course Selection

BSc Students

The core units provide the mainstream chemistry essential for students planning to major in chemistry and related sciences.

Minimum entry requirement for Senior Chemistry:

- Molecular Reactivity & Spectroscopy (2401/2911/2915)
- Chemical Structure & Stability (2402/2912/2916)

Students are strongly encouraged to enrol in elective units in addition to the core.

For accreditation by the Royal Australian Chemical Institute as a Professional Chemist, ≥ 100 hours practical required in 2nd year
– met by taking 2 x core units **and** 2 x elective units

Course Selection

Chemical Engineering

Core units:

- Forensic & Environmental Chemistry (CHEM2404)
- Chemistry of Biological Molecules (CHEM2403)

Molecular Biology and Genetics

Core unit:

- Chemistry of Biological Molecules (Chem2403)

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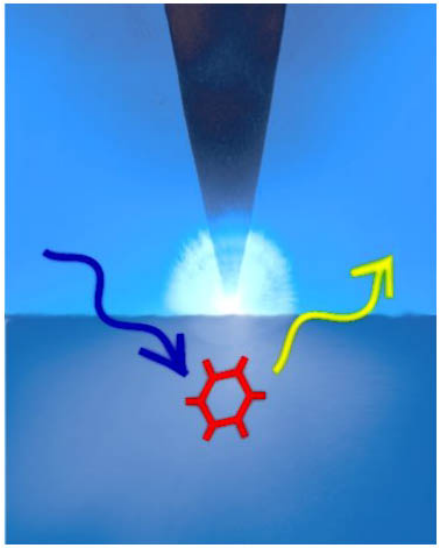
Course Content

Molecular Reactivity & Spectroscopy (CHEM 2401/2911/2915)

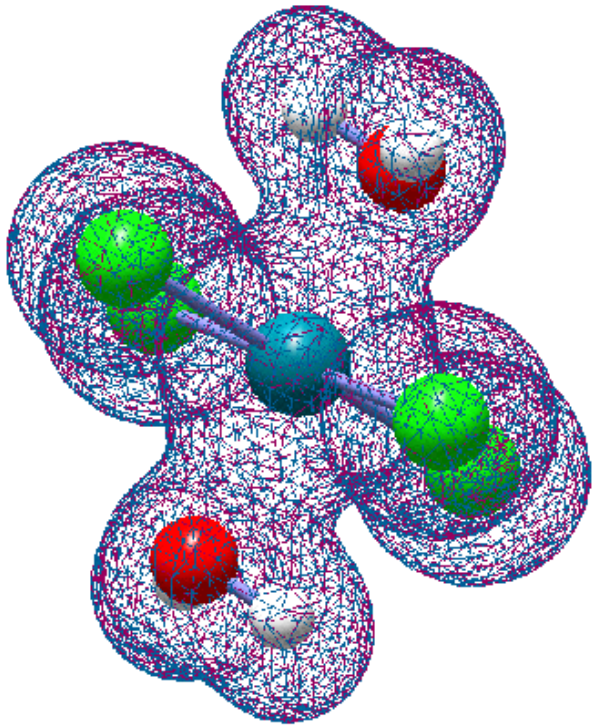


- Organic & Medicinal Chemistry
  - Organic Reaction Mechanisms
  - Aromatic Chemistry
  - Carbonyl Chemistry
- Quantum theory & Molecular spectroscopy
  - Electronic energy levels
  - Absorption, emission and scattering of radiation
  - Spectroscopic applications in analytical chemistry,

Course Content

Chemical Structure & Stability (CHEM 2402/2912/2916)

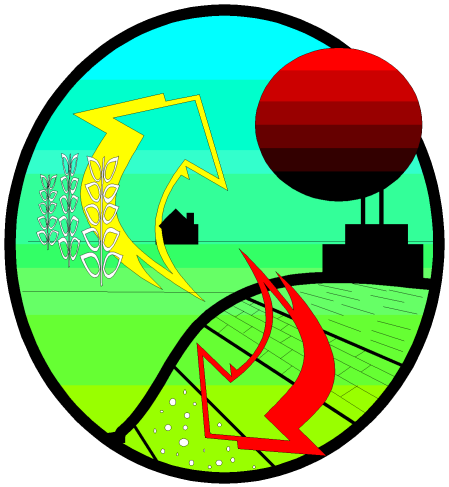
- Coordination chemistry
  - Structure and bonding in metal complexes
  - Colour, magnetism, ionic radii, stability constants
  - Redox & Ligand substitution rates
- Materials Chemistry & Nanotechnology
- Why do chemical reactions happen?
  - Statistical thermodynamics
  - Equilibrium, heat and entropy
  - Transition states
  - Kinetics



Course Content

Forensic & Environmental Chemistry (CHEM 2404)

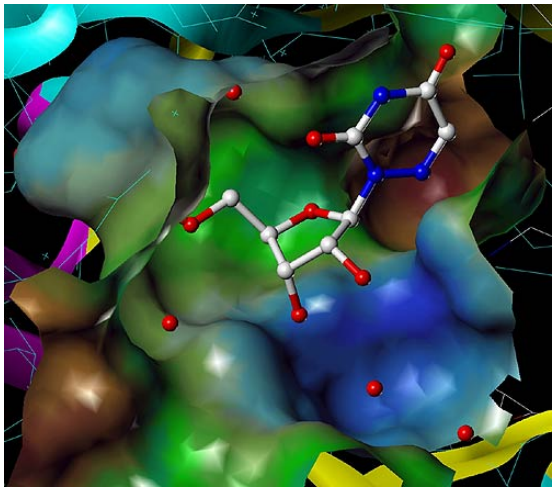
- Atmospheric chemistry
- Bio-geochemical cycling (C, N, S)
- Water and air pollution
- Catalysis and green chemistry
- Arsenic poisoning
- Drug and explosive screening
- Fingerprinting
- Forensic analyses in police, customs and insurance investigations
- Separation techniques (GC & HPLC)
- Analytical techniques (IR, UV, MS, XRD, XRF & SEM)



Course Content

Chemistry of Biological Molecules (CHEM 2403)

- Bioorganic Chemistry
  - Carbohydrates – sweeteners, blood groups & biopolymers
  - Lipids – storage, signaling and membrane structure
  - Steroids in sport and medicine
  - Proteins as drug targets; organocatalysis
- Biophysical Chemistry
  - Colloids and colloidal stability
  - Transport across cell membranes
  - Brownian motion and diffusion
- Bioinorganic Chemistry
  - Metalloproteins
  - Biomineralisation



Course Structure

Core Units

CHEM2401/ 2911/ 2915 & CHEM 2402/ 2912/ 2916)

3 lectures per week
6 tutorials per semester
8 x 4 hr laboratory sessions per semester

Elective Units

CHEM2404 & CHEM2403

3 lectures per week
6 tutorials per semester
5 x 4hr laboratory sessions per semester

Assessment

Each unit of study consists of:

- theory component (end-of-semester exam, assignments, quizzes)
- practical component.

Final assessment is based on a 3:1 weighting of theory:practical (i.e. 75% theory : 25% practical).

In order to pass any unit of study, you must achieve:

≥ 50% for the final assessment

≥ 50% for theory

≥ 50% for practical

Year in Industry Program

- students spend 12 months outside the University
- work for one of our program partners
- takes place after completion of 2nd year

Partners include:

- Australian Government Analytical Laboratories
- ANSTO
- BHP
- Caltex
- CSIRO
- Defence Science & Technology Organisation
- Dulux
- Dupont Australia
- National Industrial Chemicals Notification Scheme
- National Occupational Health & Safety Commission

For more information see Dimetra, Chemistry Front Office

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