School of Chemistry

CHEM211: Inorganic Chemistry II

Subject Outline
Autumn, 2016
On-Campus
Wollongong

Subject Information
Credit Points: 6
Pre-requisite(s): CHEM101 & CHEM102 OR CHEM104 & CHEM105 & CHEM106
Co-requisite(s): Nil
Restrictions: Nil
Contact Hours: 39hr Lecture & Tutorial, 39hr Practical

Subject Contacts

Subject Coordinator/Lecturer

<table>
<thead>
<tr>
<th>Name:</th>
<th>Dr Christopher Richardson</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location:</td>
<td>Building 18 Room 114</td>
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<tr>
<td>Telephone:</td>
<td>61 2 4221 3254</td>
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<tr>
<td>Email:</td>
<td>Chris <a href="mailto:Richardson@uow.edu.au">Richardson@uow.edu.au</a></td>
</tr>
<tr>
<td>Consultation mode and times:</td>
<td>Email for appointment</td>
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</tbody>
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Lecturer/Demonstrator/Tutor

<table>
<thead>
<tr>
<th>Name:</th>
<th>Dr Christopher Hyland</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location:</td>
<td>Building 18, Room 126</td>
</tr>
<tr>
<td>Telephone:</td>
<td>61 2 4221 4953</td>
</tr>
<tr>
<td>Email:</td>
<td><a href="mailto:chris_hyland@uow.edu.au">chris_hyland@uow.edu.au</a></td>
</tr>
<tr>
<td>Consultation mode and times:</td>
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<table>
<thead>
<tr>
<th>Name:</th>
<th>A/Prof Stephen Ralph</th>
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<tbody>
<tr>
<td>Location:</td>
<td>Building 18, Room 102A</td>
</tr>
<tr>
<td>Telephone:</td>
<td>61 2 4221 4286</td>
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<td>Email:</td>
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<tr>
<td>Consultation mode and times:</td>
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<table>
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<tr>
<th>Name:</th>
<th>Dr Carolyn Dillon</th>
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</thead>
<tbody>
<tr>
<td>Location:</td>
<td>Building 18, Room 129</td>
</tr>
<tr>
<td>Telephone:</td>
<td>61 2 4221 4930</td>
</tr>
<tr>
<td>Email:</td>
<td><a href="mailto:carolyn_dillon@uow.edu.au">carolyn_dillon@uow.edu.au</a></td>
</tr>
<tr>
<td>Consultation mode and times:</td>
<td>Email for appointment</td>
</tr>
</tbody>
</table>
Student Support and Advice
For general enquiries please contact StudentHub 41:
Location: 41.138B
Telephone: 61 2 4221 3492
Email: smah-students@uow.edu.au

Student Consultation and Communication
University staff receive many emails each day. In order to enable them to respond to your emails appropriately and in a timely fashion, students are asked to observe basic requirements of professional communication:

Consider what the communication is about
- Is your question addressed elsewhere (e.g. in the subject outline or, on the eLearning site)?
- Is it something that is better discussed in person or by telephone? This may be the case if your query requires a lengthy response or a dialogue in order to address. If so, see consultation times above and/or schedule an appointment.
- Are you addressing your request to the most appropriate person?

Specific email subject title to enable easy identification of issue
- Identify the subject code of the subject you are enquiring about (as staff may be involved in more than one subject) put this in the email subject heading. Add a brief, specific query reference after the subject code where appropriate.

Professional courtesy
- Address the staff member appropriately by name (and formal title if you do not yet know them).
- Use full words (avoid ‘text-speak’ abbreviations), correct grammar and correct spelling.
- Be respectful and courteous.
- Allow 3 – 4 working days for a response before following up. If the matter is legitimately urgent, you may wish to try telephoning the staff member (and leaving a voicemail message if necessary) or inquiring at the School Office.
- Please ensure that you include your full name and student number and identify your practical class or tutorial group in your email so that staff know who they are communicating with and can follow-up personally where appropriate.
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Section A: General Information

Subject Learning Outcomes

On completion of this subject, students should be able to:

1. be familiar with the basic chemical components in the areas of coordination chemistry, symmetry, bioinorganic chemistry and medicinal inorganic chemistry and toxicology;
2. be able to interpret written instructions and perform inorganic chemistry II laboratory experiments safely and effectively;
3. be able to record experimental results and interpret and communicate conclusions based on observations; and
4. be able to employ basic mathematics to solve quantitative chemical problems.

Subject Description

Introduction to modern coordination chemistry; crystal field theory; magnetism; UV - visible spectra of transition metal complexes; symmetry; bioinorganic chemistry; medicinal inorganic chemistry and toxicology, organometallic chemistry.

eLearning Space

This subject has materials and activities available via eLearning. To access eLearning you must have a UOW user account name and password, and be enrolled in the subject. eLearning is accessed via SOLS (student online services). Log on to SOLS and then click on the eLearning link in the menu column. For information regarding the eLearning spaces please use the following link:
http://uowblogs.com/moodlelab/files/2013/05/Moodle_StudentGuide-1petpo7.pdf

Lecture, Tutorial, Laboratory Times

All timetable information is subject to variation. Check latest timetabling information on the ‘Current Student’ webpage on UOW website or log into SOLS to view your personal timetable prior to attending classes.

Timetable information can be accessed from

Key University Dates can be accessed from

Readings, References and Materials

Textbooks
Nil

Prescribed Readings (includes eReadings)
The following readings are prescribed for this subject, but students are not expected to purchase these. They are available to students through the library on the subjects eLearning site.

Shriver and Atkins’ ‘Inorganic Chemistry’ 5th or 6th Edition

Materials
UOW approved calculator
Laboratory coat, safety glasses
Recommended Readings
The following references complement the prescribed readings and textbooks:


Organometallics: a concise introduction, Christoph Elschenbroich, Albrecht Salzer

Library link: http://iii.library.uow.edu.au/record=b1160238

Recommended readings are not intended as an exhaustive list, students should use the Library catalogue and databases to locate additional resources.

Recent Changes to this Subject
Nil

Laboratory Safety Guidelines
The rules below are general rules that are required in laboratories.

- Before commencing your project you are to ensure that you understand specific procedures for the laboratory in which you work.
- You will need to fill out a risk assessment form before commencing any experiments (confer with your laboratory supervisor).
- Never use any equipment or attempt any experiment without checking the safety implications with your laboratory supervisor or experienced delegated laboratory worker.
- Undergraduate students are not permitted to work after hours unless there is appropriate approval and supervision.
List of Topics Covered
The following are examples of the topics to be covered in this course. This is not an exhaustive list and will be subject to change.

A Timetable of Topics will be available from the eLearning site in week 1 of session.

• Periodicity
  – Trends amongst the d-block elements

• Introduction to coordination chemistry
  – Bonding
  – Coordination geometries and numbers
  – Reactions of coordination complexes
    • ligand substitution
    • Formation constants
    • HSAB theory
  – Nomenclature
  – Isomers and chirality in coordination chemistry

• Crystal Field Theory I
  – The theory and background to CFT

• Crystal Field Theory II
  – Electronic transitions
  – Relationship to spectroscopic properties
  – Relationship to magnetism in coordination complexes

• Magnetism in solids
  – Types of magnetism
  – Ferromagnets
  – Antiferromagnets

• Introduction to solid state chemistry

• Structures of solids

• Crystals

• Organometallic Chemistry
  – Introducing and using the 18-electron rule
  – The nature of bonding of carbonyl ligands to transition metals
  – Understanding π-ligand binding to transition metals
  – Introduction to organometallic reactions at the metal
  – Introduction to organometallic reactions at the ligand
  – Examples of homogenous catalysis by organometallic complexes
Section B: Assessment

Assessment Summary

<table>
<thead>
<tr>
<th>Assessment Item</th>
<th>Form of Assessment</th>
<th>Due Date</th>
<th>Return/Feedback Due Dates</th>
<th>Weighting</th>
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<tbody>
<tr>
<td>Assessment 1</td>
<td>In Class Quizzes</td>
<td>To be scheduled</td>
<td>Two weeks after due date</td>
<td>20%</td>
</tr>
<tr>
<td>Assessment 2</td>
<td>Practical reports</td>
<td>Week 5, 8, 11</td>
<td>Two weeks after due date</td>
<td>20%</td>
</tr>
<tr>
<td>Assessment 3</td>
<td>Final Exam</td>
<td>During exam period</td>
<td>Release of results</td>
<td>60%</td>
</tr>
</tbody>
</table>

Total Marks 100%

Details of Assessment Tasks

Assessment tasks will be marked using explicit criteria that will be provided to students prior to submission.

Assessment 1  
In Class Quizzes
Due date To be held in the tutorials in week 4, week 7, week 10, and week 13.
Weighting 20%
Submission Submit a hardcopy to your tutor/demonstrator in class
Type of Collaboration Individual Assessment
Length 45 minutes
Details A quiz for students to see how well they are doing
Style and format In-class quiz and submission of pre-quiz material
Subject Learning Outcomes 1, 4
Marking Criteria Marks will be awarded based on the answers to the questions assigned.

Assessment 2  
Practical reports

Due Date
Experiment 1: Week 5
Experiment 2: Week 5
Experiment 3: Week 9
Experiment 4: Week 9
Experiment 5: Week 12
Weighting 20%
Submission Submit a hardcopy to the StudentHub 41
Type of Collaboration Individual Assessment (laboratory work performed in pairs)
Length A mixture of template and self-prepared reports between 3 and 6 pages.
Details Self-prepared reports must be word processed.
Style and format Laboratory Reports
Subject Learning Outcomes 1, 2, 3, 4
Marking Criteria Marks will be allocated based on data collection and analysis (incl. accuracy and precision), performance in the laboratory, answers to questions and the submission of samples,
Assessment 3  |  Final Exam  
---|---
Due Date  |  During exam period  
Weighting  |  60%  
Submission  |  Exam papers and answers must be submitted at the conclusion of the exam.  
Type of Collaboration  |  Individual Assessment  
Length  |  Three hours  
Details  |  Three hour written examination  
Style and format  |  Short answers and calculations to questions  
Subject Learning Outcomes  |  1, 4  
Marking Criteria  |  Marks awarded based upon correctness to the questions.

Minimum Requirements for a Pass in this Subject
To receive a clear pass in this subject a total mark of 50% or more must be achieved. In addition, failure to meet any of the minimum performance requirements is grounds for awarding a Technical Fail (TF) in the subject, even where total marks accumulated are greater than 50%.

The minimum performance requirements for this subject are:
- obtain a mark of 45% or higher on the final examination
- complete all quiz and pre-quiz material
- submit 5 out of 5 practical reports
- achieve 5 or more out of 10 in a minimum of four experiments
- meet the minimum participation requirements as set out below

Minimum Student Attendance and Participation
It is expected that students will allocate 12 hours per week to this subject, including any required class attendance, completion of prescribed readings and assessment tasks.

Student attendance at tutorials and practicals is compulsory and students must attend at least 100% of classes. Absences will require the submission of an application for Academic Consideration via SOLS and the presentation of suitable documentation, for example a Medical Certificate, to Student Central as soon as practical. For further details about applying for academic consideration visit the Student Central webpage: [http://www.uow.edu.au/student/central/academicconsideration/index.html](http://www.uow.edu.au/student/central/academicconsideration/index.html)

Scaling
Scaling may occur in this subject at the end of session by the Unit Assessment Committee and/or Faculty Assessment Committee (FAC). Marks will only be scaled to ensure fairness/parity of marking across groups of students. Scaling will not affect any individual student’s rank order within their cohort. For more information refer to Assessment Guidelines – Scaling: [http://www.uow.edu.au/about/teaching/UOW039331.html](http://www.uow.edu.au/about/teaching/UOW039331.html)

Late Submission
Late submission of an assessment task without an approved extension of the deadline is not acceptable. If you are unable to submit an assessment due to extenuating circumstances (e.g. medical grounds or compassionate grounds), you can make an application of academic consideration. Not all circumstances qualify for academic consideration. For further details about applying for academic consideration visit the Student Central webpage: [http://www.uow.edu.au/student/central/academicconsideration/index.html](http://www.uow.edu.au/student/central/academicconsideration/index.html)
Late Submission Penalty – at 10%
Late submission of an assessment task without an approved extension of the deadline is not acceptable. Marks will be deducted for late submission at the rate of 10% of the total possible marks for that particular assessment task per day. This means that if a piece of work is marked out of 100, then the late penalty will be 10 marks per day (10% of 100 possible marks per day). The formula for calculating the late penalty is the total possible marks x 0.10 x number of days late. For the purposes of this policy a weekend (Saturday and Sunday) will be regarded as two days.

For example:

- Student A submits an assessment which is marked out of 100. The assessment is submitted 4 days late. This means that a late penalty of 40 marks will apply (100 x 0.10 x 4). The assessment is marked as per normal out of 100 and is given a mark of 85/100, and then the late penalty is applied. The result is that the student receives a final mark of 45/100 for the assessment (85 (original mark) – 40 marks (late penalty) = 45/100 (final mark)).

- Student B submits a report which is marked out of 20. The report is submitted three days late. This means that a late penalty of 6 marks will apply ((20 x 0.10 x 3). The report is marked as per normal out of 20 and is given a mark of 15/20, and then the late penalty is applied. The result is that the student receives a final mark of 9/20 for the report (15 (original mark) – 6 marks (late penalty) = 9/20 (final mark)).

No marks will be awarded for work submitted after the assessment has been returned to the students (except where a particular assessment task is undertaken by students at different times throughout the session, but where the assessment is based on experiments or case studies specific to a student). Notwithstanding this, students must complete all assessment tasks to a satisfactory standard and submit them, regardless of lateness or loss of marks, where submission is a condition of satisfactorily completing the subject.

Supplementary Assessments
Supplementary assessment may be offered to students whose performance in this subject is close to that required to pass the subject, and are otherwise identified as meriting an offer of a supplementary assessment. The precise form of supplementary assessment will be determined at the time the offer of a supplementary assessment is made.

Students can log on to SOLS and click on the link titled “Supplementary Assessment” to view any applicable offers or use the following link;

System of Referencing Used for Written Work
The American Chemical Society (ACS) referencing system is used in CHEM211. Failure to document adequately and fully is to ignore scholarly rules – and run the risk of plagiarism.

The American Chemical Society (ACS) referencing system will be used in CHEM211. This follows from the ACS style guide, which can be accessed through the Universities library portal and at:
http://pubs.acs.org/isbn/9780841239999

For references from a journal follow the format:
Author 1; Author 2; Author 3; etc. Title of Article. Journal Abbreviation Year, Volume, Inclusive Pagination.

For content or references from online sources indicate the URL and the date of access. More information on referencing can be found at:
Use of Internet Sources

Students are able to use the Internet to access the most current information on relevant topics and information. Internet sources should only be used after careful critical analysis of the currency of the information, the role and standing of the sponsoring institution, reputation and credentials of the author, the clarity of the information and the extent to which the information can be supported or ratified by other authoritative sources.

Plagiarism

The full policy on Academic Integrity and Plagiarism is found in the Policy Directory on the UOW website.

“The University’s Academic Integrity and Plagiarism Policy, Faculty Handbooks and subject guides clearly set out the University’s expectation that students submit only their own original work for assessment and avoid plagiarising the work of others or cheating. Re-using any of your own work (either in part or in full) which you have submitted previously for assessment is not permitted without appropriate acknowledgement. Plagiarism can be detected and has led to students being expelled from the University.

The use by students of any website that provides access to essays or other assessment items (sometimes marketed as ‘resources’), is extremely unwise. Students who provide an assessment item (or provide access to an assessment item) to others, either directly or indirectly (for example by uploading an assessment item to a website) are considered by the university to be intentionally or recklessly helping other students to cheat. This is considered academic misconduct and students place themselves at risk of being expelled from the University.”

Submission of Assessments

Assessments submitted at StudentHub 41 must have a SATS (Student Assessment Tracking System) coversheet attached to the front of the assessment. Instructions for generating a coversheet can be found on the StudentHub 41 web page: [http://smah.uow.edu.au/current-students/UOW151958.html](http://smah.uow.edu.au/current-students/UOW151958.html)

For an assessment to be successfully submitted at StudentHub 41 please note the following:

- The coversheet must be signed and dated.
- The assessment must have the correct coversheet i.e. the correct subject code and tutorial group (if applicable).
- A legible barcode with all numbers and digits below e.g. UOW20121007656.
- Assessments must be submitted by 4:00pm on the due date.

If an assessment is submitted to StudentHub 41 without any of the above we will contact you through your student email address and advise that you need to return to StudentHub 41 with the correct coversheet. Your assessment won’t be considered submitted until the correct coversheet is attached. This might mean that your assessment is submitted late.

An email receipt will be issued on the same day as submission of assessments and students are required to retain this receipt until they have received the final mark for that assessment task. It is your responsibility to contact StudentHub 41 if you have not received this receipt by the following business day. The receipt is proof of submission of assessments and students will be required to produce this in the event that an assessment task is considered to be lost. Students are also expected to keep a copy of all their submitted assessments in the event that re-submission is required. SATS Group Assessment Coversheets are printed by the lead member of the group and subsequent names can be added in the SATS student interface before printing. All members of the group must sign the printed SATS Group Assessment Coversheet before submitting the assessment.
Note that if assessments are submitted in the after-hours slot at StudentHub 41 it will be scanned into SATS the following business day. Assessments submitted via post will be scanned into SATS on the day of delivery. Any assessments received without the correct assessment coversheet attached will not be accepted by SATS. It is the student’s responsibility to ensure that the correct assessment coversheet is submitted with their assessment.

Students may post their assessments to:

StudentHub 41 (41.138B)
University of Wollongong
Wollongong NSW 2522

Assessments will be considered submitted on the date of postage. It is the student’s responsibility to ensure they have evidence of their submission date if it arrives at the office after due date.

Distance students who would like to have marked assessments returned must include a stamped self-addressed envelope with the posted assessment.

**Assessment Return**

Students will be notified when they can collect or view their marked assessment. In accordance with University Policy marked assessments will usually only be held for 21 days after the declaration of marks for that assessment.
Section C: General Advice

Students should refer to the Faculty of Science, Medicine and Health website for information on policies, learning and support services and other general advice.

University Policies

Students should be familiar with the following University policies:

a. Code of Practice – Teaching and Assessment  

b. Code of Practice – Research, where relevant  

c. Student Charter  

d. Academic Integrity and Plagiarism Policy  

e. Student Academic Consideration Policy  

f. Course Progress Policy  

g. Graduate Qualities Policy  

h. Academic Complaints Policy (Coursework and Honours Students)  

i. Policy and Guidelines on Non-Discriminatory Language Practice and Presentation  

j. Workplace Health and Safety, where relevant  

k. Intellectual Property Policy  

Student Support Services and Facilities

Students can access information on student support services and facilities at the following link. This includes information on “Academic Support”, “Starting at University, “Help at University” as well as information and support on “Career’s and Jobs”.  

Student Etiquette

Guidelines on the use of email to contact teaching staff, mobile phone use in class and information on the university guide to eLearning ‘Netiquette’ can be found at  

Version Control Table

<table>
<thead>
<tr>
<th>Version Control</th>
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<th>Author/Reviewer</th>
<th>Approved By</th>
<th>Amendment</th>
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<tr>
<td>1</td>
<td>20151111</td>
<td>Dr Christopher Richardson – Subject</td>
<td>Sonia Losinno – ADE Nominee</td>
<td>FINAL CHEM211 Autumn 2016 Subject Outline</td>
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