School of Chemistry

CHEM994: Environmental Chemistry and Climate Change

Subject Outline
Autumn, 2016
On-Campus
Wollongong

Subject Information
Credit Points: 12
Pre-requisite(s): Nil
Co-requisite(s): Nil
Restrictions: Nil
Contact Hours: 7 hours/week

Subject Contacts
Subject Coordinator/Lecturer

<table>
<thead>
<tr>
<th>Name:</th>
<th>A/PR Dianne Jolley</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location:</td>
<td>Building 18, Room 125</td>
</tr>
<tr>
<td>Telephone:</td>
<td>61 2 4221 3516</td>
</tr>
<tr>
<td>Email:</td>
<td><a href="mailto:dianne_jolley@uow.edu.au">dianne_jolley@uow.edu.au</a></td>
</tr>
<tr>
<td>Consultation mode and times:</td>
<td>Email for individual appointment.</td>
</tr>
</tbody>
</table>

Lecturer

<table>
<thead>
<tr>
<th>Name:</th>
<th>Dr Clare Murphy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location:</td>
<td>Building 18, Room 221</td>
</tr>
<tr>
<td>Telephone:</td>
<td>61 2 4221 5065</td>
</tr>
<tr>
<td>Email:</td>
<td><a href="mailto:clare_murphy@uow.edu.au">clare_murphy@uow.edu.au</a></td>
</tr>
<tr>
<td>Consultation mode and times:</td>
<td>Email for individual appointment.</td>
</tr>
</tbody>
</table>

Lecturer

<table>
<thead>
<tr>
<th>Name:</th>
<th>A/PR Stephen Wilson</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location:</td>
<td>Building 18, Room 223</td>
</tr>
<tr>
<td>Telephone:</td>
<td>61 2 4221 3505</td>
</tr>
<tr>
<td>Email:</td>
<td><a href="mailto:stephen_wilson@uow.edu.au">stephen_wilson@uow.edu.au</a></td>
</tr>
<tr>
<td>Consultation mode and times:</td>
<td>Email for individual 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:

*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.*

**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.
Table of Contents

Section A: General Information ............................................................................................................... 4
  Subject Learning Outcomes ................................................................................................................ 4
  Subject Description ............................................................................................................................. 4
  eLearning Space ................................................................................................................................. 4
  Lecture, Tutorial, Laboratory Times .................................................................................................... 4
  Readings, References and Materials .................................................................................................. 5
    Textbooks........................................................................................................................................ 5
    Prescribed Readings (includes eReadings) .................................................................................... 5
    Materials.......................................................................................................................................... 5
    Recommended Readings ................................................................................................................ 5
  Recent Changes to this Subject ........................................................................................................... 6
  Laboratory Safety Guidelines ............................................................................................................ 6
  List of Topics Covered ........................................................................................................................ 7

Section B: Assessment ........................................................................................................................... 8
  Assessment Summary ........................................................................................................................ 8
  Details of Assessment Tasks .............................................................................................................. 8
  Minimum Requirements for a Pass in this Subject ............................................................................. 9
    Minimum Student Attendance and Participation ........................................................................... 9
  Scaling................................................................................................................................................. 9
  Late Submission................................................................................................................................ 10
    Late Submission Penalty ............................................................................................................... 10
  System of Referencing Used for Written Work .................................................................................. 10
  Use of Internet Sources ..................................................................................................................... 10
  Plagiarism.......................................................................................................................................... 11
  Submission of Assessments ............................................................................................................... 11
  Assessment Return............................................................................................................................ 12

Section C: General Advice .................................................................................................................... 13
  University Policies ............................................................................................................................. 13
  Student Support Services and Facilities ............................................................................................ 14
  Student Etiquette ............................................................................................................................... 14
  Version Control Table ........................................................................................................................ 14
Section A: General Information

Subject Learning Outcomes

<table>
<thead>
<tr>
<th>No.</th>
<th>Learning Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Design and implement a program to analyse (and possibly treat) an industrial sample, interpreting the analytical data and accounting for patterns and trends observed.</td>
</tr>
<tr>
<td>2.</td>
<td>Use the mainstream journals and reference handbooks relevant to air and water pollution, and understand the major pollution concerns in the Australian environment.</td>
</tr>
<tr>
<td>3.</td>
<td>Identify the important pathways for chemical oxidation in the clean troposphere.</td>
</tr>
<tr>
<td>4.</td>
<td>Understand the dynamic balance of ozone generation and ozone removal reactions in the atmosphere.</td>
</tr>
<tr>
<td>5.</td>
<td>Appreciate the factors which determine atmospheric lifetime for key &quot;greenhouse&quot; gases.</td>
</tr>
<tr>
<td>6.</td>
<td>Appreciate that the concept of environmental pollution by an element must be seen in the context of the natural background concentrations and biogeochemical cycles of that element.</td>
</tr>
<tr>
<td>7.</td>
<td>Describe the development and components of soil.</td>
</tr>
<tr>
<td>8.</td>
<td>Explain the sorptive properties of soils, and the effect of pH on surfaces charges.</td>
</tr>
<tr>
<td>9.</td>
<td>Describe the process of soil acidification, and explain the environmental effects.</td>
</tr>
<tr>
<td>10.</td>
<td>Describe in detail the sediment transport and depositional processes, including flocculation, precipitation, coagulation and dispersion.</td>
</tr>
<tr>
<td>11.</td>
<td>Explain environmental cycling processes between sediment, water and biota at the sediment-water Interface.</td>
</tr>
<tr>
<td>12.</td>
<td>Illustrate and describe the global cycling of the major elements (C, N, O, and P).</td>
</tr>
<tr>
<td>13.</td>
<td>Compare various types of water treatment processes.</td>
</tr>
<tr>
<td>14.</td>
<td>Discuss water quality criteria and monitoring in Australia.</td>
</tr>
</tbody>
</table>

Subject Description
The environment depends on complex interactions of chemical, physical and biological processes. These can be both natural and anthropogenic in origin and change with time. In this subject the chemical aspects are highlighted in strands including: atmospheric chemistry, aquatic chemistry and soil chemistry. This subject also investigates methods for assessing the chemical state of the environment.

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. http://www.uow.edu.au/student/index.html

Timetable information can be accessed from

Key University Dates can be accessed from
Readings, References and Materials

Textbooks
The following text(s) will need to be purchased by students enrolled in this class.

Nil

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


Materials
Laboratory Coat
Safety Glasses
Black Permanent Marker
Hardcover Laboratory notebook (Available from UniShop)

Recommended Readings
The following references complement the prescribed readings and textbooks:

The following books have been placed in the short loans collection of the University of Wollongong library:


The following books are relevant to the subject and have been placed on 1 week loan. If demand is high, they will be shifted into the short loan collection.


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

i. 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 supervisor).
- Never use any equipment or attempt any experiment without checking the safety implications with your 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.

<table>
<thead>
<tr>
<th>Module</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module 2: Aquatic Chemistry</td>
<td>Properties and composition of surface waters, physico-chemical parameters. Water-sediment interface, major chemical cycles.</td>
</tr>
<tr>
<td>Module 4: Tropospheric chemistry</td>
<td>Major chemical cycles, OH, O3, CH4, S Sources of air pollution. Control of air pollutants.</td>
</tr>
<tr>
<td>Module 5: Literature Project</td>
<td>An extensive literature project on a current issue in environmental chemistry and climate change, with the specific topic negotiated with the subject co-ordinator</td>
</tr>
</tbody>
</table>
# 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 date</th>
<th>Weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessment 1</td>
<td>Practical Assessment Written Report and seminar</td>
<td>Thursday of Week 13</td>
<td>Within 21 days of due date</td>
<td>27%</td>
</tr>
<tr>
<td>Assessment 2</td>
<td>Soils and waters In class test</td>
<td>Week 7</td>
<td>Within 21 days of due date</td>
<td>20%</td>
</tr>
<tr>
<td>Assessment 3</td>
<td>Atmospheric Final Exam</td>
<td>UOW exam period</td>
<td>Release of results</td>
<td>20%</td>
</tr>
<tr>
<td>Assessment 4</td>
<td>Literature Project</td>
<td>UOW exam period</td>
<td></td>
<td>33%</td>
</tr>
<tr>
<td></td>
<td><strong>Total Marks</strong></td>
<td></td>
<td></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

## Details of Assessment Tasks

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

<table>
<thead>
<tr>
<th>Assessment 1</th>
<th>Practical Assessment Written Report and seminar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Due date</td>
<td>Thursday of Week 13</td>
</tr>
<tr>
<td>Weighting</td>
<td>27%</td>
</tr>
<tr>
<td>Submission</td>
<td>Submit a hardcopy of your assessment to the Student Centre AND Submit an electronic (PDF) copy of your assessment via email to the subject coordinator</td>
</tr>
<tr>
<td>Type of Collaboration</td>
<td>Individual Assessment</td>
</tr>
<tr>
<td>Length</td>
<td>30-40 pages</td>
</tr>
<tr>
<td>Details</td>
<td>See the details included in the practical work guidelines for report structure and writing suggestions. These should be read in conjunction with this document.</td>
</tr>
<tr>
<td>Style and format</td>
<td>Report</td>
</tr>
<tr>
<td>Subject Learning Outcomes</td>
<td>1-14</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Assessment 2</th>
<th>Soils and waters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Due date</td>
<td>Week 7</td>
</tr>
<tr>
<td>Weighting</td>
<td>20%</td>
</tr>
<tr>
<td>Submission</td>
<td>Exam papers and answers must be submitted at the conclusion of the exam.</td>
</tr>
<tr>
<td>Type of Collaboration</td>
<td>Individual Assessment</td>
</tr>
<tr>
<td>Length</td>
<td>2 hours</td>
</tr>
<tr>
<td>Details</td>
<td>Major assessment of course content from weeks 1-6 inclusive. Note: deferred exams will most likely be in the form of an oral defence.</td>
</tr>
<tr>
<td>Style and format</td>
<td>In-class test</td>
</tr>
<tr>
<td>Subject Learning Outcomes</td>
<td>1-14</td>
</tr>
<tr>
<td>Assessment 3</td>
<td>Atmospheric</td>
</tr>
<tr>
<td>-------------</td>
<td>-------------</td>
</tr>
<tr>
<td>Due date</td>
<td>UOW Exam Period</td>
</tr>
<tr>
<td>Weighting</td>
<td>20%</td>
</tr>
<tr>
<td>Submission</td>
<td>Exam papers and answers must be submitted at the conclusion of the exam.</td>
</tr>
<tr>
<td>Type of Collaboration</td>
<td>Individual Assessment</td>
</tr>
<tr>
<td>Length</td>
<td>2 hours</td>
</tr>
<tr>
<td>Details</td>
<td>Major assessment of course content from weeks 7-13 inclusive. Note: deferred exams will most likely be in the form of an oral defence.</td>
</tr>
<tr>
<td>Style and format</td>
<td>Final Exam</td>
</tr>
<tr>
<td>Subject Learning Outcomes</td>
<td>1-14</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Assessment 4</th>
<th>Literature Review</th>
</tr>
</thead>
<tbody>
<tr>
<td>Due date</td>
<td>UOW Exam Period</td>
</tr>
<tr>
<td>Weighting</td>
<td>33%</td>
</tr>
<tr>
<td>Submission</td>
<td>Submit an electronic (PDF) copy of your assessment via upload to eLearning</td>
</tr>
<tr>
<td>Type of Collaboration</td>
<td>Individual Assessment</td>
</tr>
<tr>
<td>Length</td>
<td>2000 words</td>
</tr>
<tr>
<td>Details</td>
<td>Topic and format provided during discussion with subject co-ordinator during week 2 of session. Late penalties apply at 10% of the value of the work per day.</td>
</tr>
<tr>
<td>Style and format</td>
<td>Report</td>
</tr>
<tr>
<td>Subject Learning Outcomes</td>
<td>1-14</td>
</tr>
</tbody>
</table>

**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 final total combined mark of 50% on the exam components
- Achieve at least 50% on the practical component

**Minimum Student Attendance and Participation**

It is expected that students will allocate 24 hours per week to this subject, including any required class attendance, completion of prescribed readings and assessment tasks.

Student attendance at practicals (with the exception of week 1 and 2 which are compulsory) is not compulsory but is strongly recommended.

**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/policy/UOW058609.html](http://www.uow.edu.au/about/policy/UOW058609.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: 

Late Submission Penalty

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.

System of Referencing Used for Written Work

The Author-Date (Harvard) referencing system should, unless otherwise specified for a particular assessment (check Details of Assessment Tasks), be utilised. A summary of the Harvard system can be accessed on the Library website at: http://public01.library.uow.edu.au/refcite/style-guides/html/

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
Refer to the submission requirements under the details of the individual assessments. Students should ensure that they receive a receipt/evidence acknowledging assessment submission. 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 assignments in the event that re-submission is required.

ASSESSMENT ONE SUBMISSION ONLY
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

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 are able to view their marked assessment. In accordance with University Policy marked assignments will usually only be held for 21 days after the declaration of marks for that assignment.
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. Code of Practice – Honours, where relevant

d. Student Charter

e. Code of Practice – Student Professional Experience, where relevant

f. Academic Integrity and Plagiarism Policy

g. Student Academic Consideration Policy

h. Course Progress Policy

i. Graduate Qualities Policy

j. Academic Complaints Policy (Coursework and Honours Students)

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

l. Workplace Health and Safety, where relevant

m. Intellectual Property Policy

n. IP Student Assessment of Intellectual Property Policy, where relevant

o. Policy on Ethical Objection by Students to the Use of Animal and Animal Products in Coursework Subjects, where relevant

p. Human Research Ethics Guidelines, where relevant

q. Animal Research Guidelines, where relevant
r. Student Conduct Rules and accompanying Procedures or Research Misconduct Policy for research students

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”. http://www.uow.edu.au/student/services/index.html

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 http://www.uow.edu.au/student/elearning/netiquette/index.html

Version Control Table

<table>
<thead>
<tr>
<th>Version Control</th>
<th>Release Date</th>
<th>Author/Reviewer</th>
<th>Approved By</th>
<th>Amendment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>20160111</td>
<td>A/PR Dianne Jolley Subject Coordinator</td>
<td>Sonia Losinno – ADE Nominee</td>
<td>FINAL CHEM994 Autumn 2016 Subject OUtline</td>
</tr>
</tbody>
</table>