CHEM4500

HONOURS IN CHEMISTRY

(FEBRUARY START)

SEMESTERS 1 & 2, 2016
1. Information about the Course

NB: Some of this information is available on the UNSW Virtual Handbook.

<table>
<thead>
<tr>
<th>Component</th>
<th>HPW</th>
<th>Time</th>
<th>Day</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures/Workshops</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Research project</td>
<td>32 (S2), 32 (S1)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>35</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

**Special Details**

Flexible time to be made through arrangement with the principal research supervisor. It is the students responsibility to organise time between coursework and research.

2. Staff Involved in the Course

<table>
<thead>
<tr>
<th>Staff</th>
<th>Role</th>
<th>Name</th>
<th>Contact Details</th>
<th>Consultation Times</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Convener</td>
<td>A/Prof. J.A. Stride</td>
<td>Room 131 Dalton</td>
<td><a href="mailto:j.stride@unsw.edu.au">j.stride@unsw.edu.au</a> x54672</td>
<td></td>
</tr>
<tr>
<td>Additional Teaching Staff</td>
<td>Lecturers &amp; Facilitators</td>
<td>Coursework: see CHEM6701 and CHEM6702</td>
<td>A/Prof. P. Thordarson Room 133 Dalton <a href="mailto:p.thordarson@unsw.edu.au">p.thordarson@unsw.edu.au</a></td>
<td></td>
</tr>
<tr>
<td>Tutors &amp; Demonstrators</td>
<td>n/a</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technical &amp; Laboratory Staff</td>
<td>n/a</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Support Staff</td>
<td>n/a</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Course Description

**Handbook Entry**

Designed for those with a higher level of preparedness in Chemistry. A multifaceted course that will give students a high level of basic research skills, especially in critical evaluation of data and communication of results, but with a specialised focus on Chemistry. Consists of a selection of lectures and seminars on advanced topics in chemistry and a research project.

*Note: Honours consists of 48 UoC taken over two sessions, each consisting of 24 UoC and made up of 2 x (18 UoC research + 6 UoC coursework).*

### Course Aims

The course aims expand the student's knowledge of chemistry research in a research specialisation chosen by the student. This will include understanding the process through which research is planned, carried out and reported. There is also significant interaction with the research group of the supervisor chosen for the project. In addition, a significant emphasis is put on increasing the general chemical knowledge of the student through advanced courses in frontline, state of the art characterisation techniques: Namely Advanced NMR spectroscopy and Advanced scattering methods.

### Student Learning Outcomes

At the end of this course the students should be able to undertake an independent research project with minimal supervision. They should also be familiar with research techniques and have the ability to accurately acquire, record, analyse, interpret and communicate scientific data.

### Graduate Attributes Developed in this Course

<table>
<thead>
<tr>
<th>Science Graduate Attributes</th>
<th>Select the level of FOCUS</th>
<th>Activities / Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research, inquiry and analytical thinking abilities</td>
<td>3</td>
<td>In-depth discussions on research topics. Able to do thorough literature surveys and critically evaluate the scientific literature for a given research topic. Apply the knowledge gained for further advancement of their research project.</td>
</tr>
<tr>
<td>Capability and motivation for intellectual development</td>
<td>3</td>
<td>Learned practical research techniques in chemistry and biology in the relevant areas. Be able to accurately assess data and make informed decisions. Be able to communicate scientific research both orally and as written reports.</td>
</tr>
<tr>
<td>Ethical, social and professional understanding</td>
<td>3</td>
<td>Throughout course. Attending relevant HS training and knowledge and commitment to HS responsibilities. Final exams and assignments.</td>
</tr>
<tr>
<td>Communication</td>
<td>3</td>
<td>Write up of research proposal and honours thesis. Presentation of introductory and final seminars. Feedback from research proposal, assignments and workshop reports.</td>
</tr>
<tr>
<td>Teamwork, collaborative and management skills</td>
<td>3</td>
<td>Working in groups during workshop sessions. Assessment of group reports. Interaction with a research group.</td>
</tr>
<tr>
<td>Information literacy</td>
<td>3</td>
<td>Research required for design of laboratory experiments and understanding of research project. Feedback on reports and suggested corrections.</td>
</tr>
</tbody>
</table>

### Other attributes

None

### Professional accreditation attributes

RACI – membership of professional body


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3 Learning and Teaching Unit: [http://www.ltu.unsw.edu.au](http://www.ltu.unsw.edu.au)


5 Faculty of Science – Science Graduate Attributes: [http://www.science.unsw.edu.au/future-students/graduate-attributes](http://www.science.unsw.edu.au/future-students/graduate-attributes)
<table>
<thead>
<tr>
<th>Level of Material Delivered</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ ] Introduction to material</td>
</tr>
<tr>
<td>[x] Emphasised and taught in depth</td>
</tr>
<tr>
<td>[ ] Reinforced and additional expertise</td>
</tr>
<tr>
<td>[ ] Competencies applied</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Major Topics (Syllabus Outline)</th>
</tr>
</thead>
<tbody>
<tr>
<td>See School of Chemistry Research Booklet for research projects.</td>
</tr>
<tr>
<td>Students must take the course “Research Skills” (CHEM4501) and <strong>three</strong> of the Topics courses offered within CHEM6702/1.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Relationship to Other Courses within the Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>The course builds upon the concepts learned during the first three years of the program and will enable students to progress seamlessly into a higher degree if they wish. It builds on the core courses taught by the Schools of Chemistry.</td>
</tr>
</tbody>
</table>
4. Rationale and Strategies Underpinning the Course

| Rationale for learning and teaching in this course⁶, i.e., How this course is taught? | The integration of lectures, workshops AND the development of a research project, including the design the experiments that they undertake supports, supports “Engage student in learning”:

  - **Guideline 1.** Actively engage students in the learning process.
  - **Guideline 2.** Create an appropriately challenging climate of enquiry; link activities to research and scholarship.
  - **Guideline 4.** Build into your course opportunities for students to reflect on their experiences, challenge their current beliefs and develop new practices and understanding.

  Carrying out research in contemporary areas of chemistry allows students to apply information learnt in previous areas and encourages them to “Contextualise learning”. This is reinforced by direct interaction between the student and research supervisor.

  - **Guideline 5.** Recognise and build on students’ prior experience and knowledge.
  - **Guideline 6.** Emphasise the relevance of students’ learning in professional, disciplinary and personal contexts.
  - **Guideline 7.** Encourage dialogue between students and teachers, and among students in and out of class, creating a community of learners.

  “Curriculum Design” – *Fostering an environment for students to take responsibility for their own learning with a clearly outlined set of expectations encourages higher order, independent thinking in a disciplinary.*

  - **Guideline 10.** Clearly articulate your expectations and the course goals, learning outcomes and requirements.
  - **Guideline 11.** Encourage students to take responsibility for their own learning, so that they develop higher-order thinking skills such as analysis, synthesis and evaluation.
  - **Guideline 12.** Embed acquisition of graduate capabilities in your course. These capabilities are best acquired in a disciplinary context.

    Providing a well IT resourced and stimulating environment for independent learning (research project), with abundant opportunity for cooperative learning (research group), appropriate and aligned assessment tasks and timely feedback leads to engaged, contextualised and inclusive teaching practices.

    - **Guideline 13.** Encourage independent learning through the appropriate use of information and communication technologies.
    - **Guideline 14.** Create opportunities for students to learn cooperatively with peers, to help them develop interpersonal, professional and cognitive skills.
    - **Guideline 15.** Align assessment practices with the desired learning outcomes.
    - **Guideline 16.** Give students meaningful and timely feedback.

<table>
<thead>
<tr>
<th>Teaching Strategies</th>
<th>How the assessment supports and assists the learning⁷</th>
</tr>
</thead>
</table>
|                     | The assessment is targeted to encourage critical analytical thinking in the assessment of laboratory results and understanding of a research project. Assessment tasks closely reflect professional practice thereby contextualising and co-aligning the learning and assessment process. The theory assessment focuses on broadening the students understanding in key areas of chemistry. Where possible, these courses are assessed by evaluating the application of knowledge or skills in a format consistent with professional activities.

  Timely feedback and marking of workshop reports and assignments allows students to follow the thread of the course. The final examination, seminar assessment, and thesis preparation and submission bring together the strands to complete the learning experience. |

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⁶ LTU – Teaching Philosophy: [http://teaching.unsw.edu.au/developing-academic-style](http://teaching.unsw.edu.au/developing-academic-style)

5. Course Schedule

Some of this information is available on the Virtual Handbook\textsuperscript{8} and the UNSW Timetable\textsuperscript{9}.

<table>
<thead>
<tr>
<th>Date</th>
<th>Assignment and Submission dates (see also 'Assessment Tasks &amp; Feedback')</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research Seminars\textsuperscript{10}</td>
<td>It is mandatory that Honours students attend all School research seminars (postgraduate and external speakers). These are typically held on Tuesday and Thursday at 12 pm during semester. There is no formal assessment task for this component aside from attendance.</td>
</tr>
<tr>
<td>Session 1</td>
<td>Various contributions to coursework assessment (see coursework coordinators).</td>
</tr>
<tr>
<td>Monday 4 April</td>
<td>Research proposal due as a .pdf to Ms Anne Ayres (<a href="mailto:a.ayres@unsw.edu.au">a.ayres@unsw.edu.au</a>) &amp; copied to A/Prof. J. Stride (<a href="mailto:j.stride@unsw.edu.au">j.stride@unsw.edu.au</a>). Please use the file format: SURNAME_student#_program_primary supervisor surname_PROPOSAL.pdf; e.g. SMITH_3123456_Chemistry_Stride_INTRO.pdf</td>
</tr>
<tr>
<td>Week beginning 11 April (week 6)</td>
<td>Introductory Seminar (location TBA)</td>
</tr>
<tr>
<td>Session 2</td>
<td>Various contributions to coursework assessment (see coursework coordinators).</td>
</tr>
<tr>
<td>Friday 28 October</td>
<td>Thesis due as .pdf to Ms Anne Ayres (<a href="mailto:a.ayres@unsw.edu.au">a.ayres@unsw.edu.au</a>) &amp; copied to A/Prof. J. Stride (<a href="mailto:j.stride@unsw.edu.au">j.stride@unsw.edu.au</a>). Please use the file format: SURNAME_student#_program_primary supervisor surname_THESIS.pdf; e.g. SMITH_3123456_Chemistry_Stride_THESIS.pdf</td>
</tr>
<tr>
<td>Week beginning 7 November</td>
<td>Final research seminar and oral examination (locations and times to be announced)</td>
</tr>
</tbody>
</table>

\textsuperscript{10} Student attendance of postgraduate and external research seminars indexed to the grading committee mark (see section 6). For instance, attendance of 50% of the seminars will result in halving of the grading committee mark. A regularly audited attendance book is circulated during each seminar.
6. Assessment Tasks and Feedback

<table>
<thead>
<tr>
<th>Task</th>
<th>% of total mark</th>
<th>Assessment Criteria</th>
<th>Date of Feedback</th>
<th>Feedback</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coursework &amp; Research Proposal</td>
<td>12.5%</td>
<td>Assessment of introductory seminar &amp; proposal</td>
<td>4 April</td>
<td>A/Prof. Stride</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8.75%</td>
<td>Week beginning 11 April</td>
<td>Within 3 weeks of completion of assessment tasks</td>
</tr>
<tr>
<td>Introductory Seminar</td>
<td>3.75%</td>
<td>Answers to questions given correctly. Discussion shows knowledge and understanding of the course.</td>
<td></td>
<td>Emailed feedback</td>
</tr>
<tr>
<td>Coursework Examination &amp; assessment</td>
<td>12.5%</td>
<td>Understanding of background, outline of project aims, design of experiment, assessment of risk, communication of results, interpretation of results and design of subsequent experiments. Note, includes interpreting feedback from intro report.</td>
<td>28 October</td>
<td>Examination panel</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Answers to questions given correctly. Discussion shows knowledge and understanding of the course.</td>
<td></td>
<td>At seminar defence</td>
</tr>
<tr>
<td>Thesis</td>
<td>45%</td>
<td>Understanding of background, outline of project aims, design of experiment, assessment of risk, communication of results, interpretation of results and design of subsequent experiments. Note, includes interpreting feedback from intro report.</td>
<td>28 October</td>
<td>Examination panel.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Highlights communication of results with key features as per thesis and interpretation of key outcomes and their relevance. Ability to communicate and defend information presented in thesis (see thesis requirements), and respond to questions.</td>
<td>Week beginning 7 November</td>
<td>Annotated theses.</td>
</tr>
<tr>
<td>Research Seminar</td>
<td>11.25%</td>
<td>Highlights communication of results with key features as per thesis and interpretation of key outcomes and their relevance. Ability to communicate and defend information presented in thesis (see thesis requirements), and respond to questions.</td>
<td>Week beginning 7 November</td>
<td>Final assessment outcome.</td>
</tr>
<tr>
<td>Oral examination</td>
<td>18.75%</td>
<td>Ability to communicate and defend information presented in thesis and place the work into the general context of chemical sciences - particular attention will be given to the ability of the student to respond to questions.</td>
<td>Week beginning 7 November</td>
<td>Final assessment outcome.</td>
</tr>
</tbody>
</table>

Honours class boundaries: Final mark of >84 = 1st class, 75-84 = 2nd class division 1, 65-74 = 2nd class division 2, 50-64 = 3rd class.
7. Additional Resources and Support

<table>
<thead>
<tr>
<th>Text Books</th>
<th>n/a</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required Readings</td>
<td>n/a</td>
</tr>
<tr>
<td>Additional Readings</td>
<td>Distributed by individual supervisors and individual lecturers.</td>
</tr>
<tr>
<td>Recommended Internet Sites</td>
<td>See School of Chemistry intrawebsite (<a href="http://www.chem.unsw.edu.au/local">www.chem.unsw.edu.au/local</a>) and Moodle websites for Chemistry Honours (CHEM400X, X = 2-5) and Topics in Contemporary Chemistry A and B (CHEM6701 and CHEM6702).</td>
</tr>
</tbody>
</table>
| Computer Laboratories or Study Spaces | Gibson Computer laboratory – Ground floor, Dalton Building  
Members: Students of Chemistry Society Room – Ground floor, Dalton Building (G06). |

8. Required Equipment, Training and Enabling Skills

| Equipment Required | Laboratory coat, safety glasses, enclosed shoes (no thongs/flip flops, sandals, open back or top footwear). |
| Enabling Skills - training which maybe required to complete this course | School HS induction and UNSW HS training (myUNSW)  
UNSW plagiarism guidelines  
Environmental compliance training (myUNSW)  
Project specific training (supervisor) |

9. Course Evaluation and Development

Student feedback is gathered periodically by various means. Such feedback is considered carefully with a view to acting on it constructively wherever possible. This course outline conveys how feedback has helped to shape and develop this course.

<table>
<thead>
<tr>
<th>Mechanisms of Review</th>
<th>Last Review Date</th>
<th>Comments or Changes Resulting from Reviews</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major Course Review</td>
<td>2014</td>
<td>Core course structure modified to consist of 37 UoC research + 12 UoC coursework.</td>
</tr>
<tr>
<td>CATEI¹²</td>
<td>2014</td>
<td>Transparency in grading &amp; assessments.</td>
</tr>
<tr>
<td></td>
<td>2011</td>
<td>Change in assessment to reflect greater proportion of time spent in research component. Elimination of supervisor mark. Coursework streamlined to core courses in the Topics in Contemporary Chemistry courses (CHEM6701 and CHEM6702) or other non-courses in these if 6701 or 6702 taken in the earlier year of study. Previous coursework structure disbanded.</td>
</tr>
<tr>
<td></td>
<td>2007</td>
<td>Change in assessment to reflect greater proportion of time spent in research component. Decrease in emphasis of supervisor's mark. Physical chemistry course combined with NANO programme to streamline teaching.</td>
</tr>
<tr>
<td></td>
<td>2008</td>
<td>Modification of midyear start deadlines to reflect time pressure. Modification of assessment in physical chemistry programme to equalise assessment tasks in each of the coursework components.</td>
</tr>
</tbody>
</table>

# 10. Administration Matters

## Expectations of Students

**Workload**

There are no formal contact hours. Students are expected to attend 9am-5pm, 5 days per week. Additional time WILL BE necessary as submission deadlines approach. Several compulsory activities are scheduled during the period listed above. For instance, it is mandatory for students to attend school postgraduate and external research seminars (Tues and Thurs, 12pm).

## Assignment Submissions

**Coursework:** Assessment submissions should be made directly to the lecturer. For written submissions, a cover sheet should be completed and dated. These can be sourced from the School of Chemistry office.

**Research Project:** Introductory essays and theses should be submitted in .pdf format to Ms Anne Ayres of the School of Chemistry office (a.ayres@unsw.edu.au). See section 5 for instructions on file naming.

## Work Health and Safety

Information on relevant Health and Safety policies and expectations at UNSW can be sourced at: [http://www.ohs.unsw.edu.au/](http://www.ohs.unsw.edu.au/)


To be admitted to a laboratory, you must wear safety glasses, a lab coat and covered shoes. You must also complete all safety pre-lab work, risk assessment or other prescribed preparation relating to carrying out safe laboratory work. Visitors are not allowed into the laboratories unless they have supervisor approval.

**NOTE:** a risk assessment must be completed before any laboratory work can be done.

## Examination Procedures

Candidates must demonstrate a satisfactory performance (>49%) in each of the assessment tasks (coursework, research thesis and seminar-defence). Students who do not attain a mark of 50% in any component cannot pass Honours and will be awarded an unsatisfactory fail (UF).

An overall average of fifty percent in the coursework is required. If this is not achieved, the student will be asked to withdraw.

## Attendance Requirements

The Honours course runs from early-February to mid-November (S1 entry) or the beginning of semester 2 to mid-June the following year (S2 entry). Students are expected to attend during standard working hours (9am-5pm) from Monday to Friday and must seek the consent of their supervisor if there is to be any variation in attendance.

If a student is absent for a period of time due to illness or other reasons, the supervisor AND the Honours coordinator must be informed and a copy of medical certificate must be submitted to the coordinator within 7 days of the absence.

All applications for special consideration must be submitted using the correct UNSW protocols: see [https://my.unsw.edu.au/student/atoz/SpecialConsideration.html](https://my.unsw.edu.au/student/atoz/SpecialConsideration.html)

**NOTE:** With the sole exception of the Christmas-New Year UNSW shutdown period, there are no defined holiday periods during the Honours year. Planned absences of more than two weeks may be allowable, but only with permission from your research supervisor and the Honours Coordinator.

## Equity and Diversity

Those students who have a disability that requires some adjustment in their teaching or learning environment are encouraged to discuss their study needs with the course convener prior to, or at the commencement of, their course, or with the Equity Officer (Disability) in the Equity and Diversity Unit ([http://www.studentequity.unsw.edu.au/](http://www.studentequity.unsw.edu.au/)).

Issues to be discussed may include access to materials, signers or note-takers, the provision of services and additional exam and assessment arrangements. Early notification is essential to enable any necessary adjustments to be made.

## Grievance Policy

<table>
<thead>
<tr>
<th>School Contact</th>
<th>Faculty Contact</th>
<th>University Contact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professor Scott Kable</td>
<td>Dr Chris Tisdell</td>
<td>University Counselling Services</td>
</tr>
<tr>
<td>Director of Teaching</td>
<td>Associate Dean (Education)</td>
<td>Tel: 9385 5418</td>
</tr>
<tr>
<td><a href="mailto:s.kable@unsw.edu.au">s.kable@unsw.edu.au</a></td>
<td><a href="mailto:cct@unsw.edu.au">cct@unsw.edu.au</a></td>
<td><a href="https://www.counselling.unsw.edu.au/">https://www.counselling.unsw.edu.au/</a></td>
</tr>
<tr>
<td>Tel: 9385 4713</td>
<td>Tel: 9385 7083</td>
<td></td>
</tr>
</tbody>
</table>

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What is Plagiarism?

Plagiarism is the presentation of the thoughts or work of another as one’s own.

*Examples include:

- direct duplication of the thoughts or work of another, including by copying material, ideas or concepts from a book, article, report or other written document (whether published or unpublished), composition, artwork, design, drawing, circuitry, computer program or software, web site, Internet, other electronic resource, or another person’s assignment without appropriate acknowledgement;
- paraphrasing another person’s work with very minor changes keeping the meaning, form and/or progression of ideas of the original;
- piecing together sections of the work of others into a new whole;
- presenting an assessment item as independent work when it has been produced in whole or part in collusion with other people, for example, another student or a tutor; and
- claiming credit for a proportion a work contributed to a group assessment item that is greater than that actually contributed.†

For the purposes of this policy, submitting an assessment item that has already been submitted for academic credit elsewhere may be considered plagiarism.

Knowingly permitting your work to be copied by another student may also be considered to be plagiarism.

Note that an assessment item produced in oral, not written, form, or involving live presentation, may similarly contain plagiarised material.

The inclusion of the thoughts or work of another with attribution appropriate to the academic discipline does not amount to plagiarism.

The Learning Centre website is main repository for resources for staff and students on plagiarism and academic honesty. These resources can be located via:

: http://www.ohs.unsw.edu.au/

The Learning Centre also provides substantial educational written materials, workshops, and tutorials to aid students, for example, in:

- correct referencing practices;
- paraphrasing, summarising, essay writing, and time management;
- appropriate use of, and attribution for, a range of materials including text, images, formulae and concepts.

Individual assistance is available on request from The Learning Centre.

Students are also reminded that careful time management is an important part of study and one of the identified causes of plagiarism is poor time management. Students should allow sufficient time for research, drafting, and the proper referencing of sources in preparing all assessment items.

* Based on that proposed to the University of Newcastle by the St James Ethics Centre. Used with kind permission from the University of Newcastle
† Adapted with kind permission from the University of Melbourne.

The School has also produced a guide for students in chemistry courses, including examples of acceptable and unacceptable conduct, guidelines on avoiding misconduct in laboratory contexts and examples of acceptable referencing procedures for essays and literature reviews. This can be accessed at https://www.chem.unsw.edu.au/coursenotes/plagiarism/Chem_Anti_Plag_05.pdf
THE RESEARCH PROJECT

General - The research project is the distinctive feature of the Honours year. It is the major undertaking of the year, representing 90% of the assessment, and is the most challenging and rewarding aspect of Honours.

Students work on original research projects conceived and overseen by a member of staff. Although students are instructed by their supervisor on the nature and subject area of the project, and given guidance on how to conduct it, it is expected that the student performs all experimental work independently. They are expected to prepare and analyse experimental results and work with the supervisor (or senior researchers in the research group) to identify and overcome any problems. At the completion of the year, students present a thesis detailing the background, aims, experimental procedures, results and discussion, future directions of the project, and conclusions.

Research Proposal - To assist in the preparation of a thesis and to allow writing styles to be improved, students are required to submit a research proposal (to Ms Anne Ayres, anne.ayres@unsw.edu.au copied to A/Prof. J. Stride, j.stride@unsw.edu.au, deadline Monday 7 September, see section 5 for file naming convention) describing the background to their research project and how the project will advance knowledge in the area. This is a concise document (max 4 pages). It should address the following headings:
- A brief introduction to the project and its rationale (titled "Background").
- The tentative aims of the project (titled "Aims of this Project")
- A plan of how the aims will be achieved, e.g. techniques to be used, general types of experiments to be performed (titled "Approach and Methodology")
- The anticipated outcomes of the project (titled "Anticipated Outcomes").

In addition, your proposal should have a cover page clearly stating your projects’ tentative title, your name, z-number, your supervisor(s) name, and your major. This cover page is not included in the 4-page limit.

It is recommended that students issue a progress report (before S2 for S1 entry, before S1 for S2 entry) to their supervisor (NOT to Ms Anne Ayres) that incorporates updates resulting from the introductory essay, all experimental work to that time, a brief results and discussion section, and examples of other sections pertinent to the final research thesis, e.g. conclusion, references, abbreviations list, table of contents, appendices. This represents a 2nd opportunity to obtain feedback on your writing and continues the thesis drafting process. There will be no formal requirement to do this and it will not be assessed; it is purely for the benefit of you and your supervisor in effectively managing your project.

Introductory Seminar - Students present two compulsory seminars during their Honours year. The first is the introductory seminar which, which is graded alongside the research proposal (see below). It serves to provide students with feedback on their presentation style and content. There is a 5 minute time limit on the presentation (+2 minutes of questions) and a limit of 3 slides (non-animated). During your presentation you should outline the background, aims and significance of the project, and a description of the methods used/to be used. It is a concise ‘clip’ of your proposed research project intended to deliver the essentials in a clear and succinct manner.

The research proposal and introductory seminar together constitute 12.5% of the total mark for the Honour year.
It is anticipated that the research proposal and introductory seminar will allow students to familiarise themselves with the requirements of rationalising their project which will assist with thesis writing; a second (optional) report to the supervisor mid-year will provide a vehicle for reviewing the research performed mid-way through the Honours year.

Honours Thesis - Towards the end of your Honours year you will prepare a research thesis. The thesis embodies an introduction to the background to the project and its objectives, i.e. an updated version of your introductory essay, the research undertaken and discussion of results, conclusions drawn from the research project, full bibliography, and a complete experimental. The content of the thesis should be concise, clear, and written in a normal scientific style for a general chemistry literate readership. The thesis has a 50 page limit inclusive of references and must be formatted according to the regulations listed below. Its examination represents 45% of the overall course mark.
SUBMISSION OF THESIS
A .pdf of your thesis must be submitted to A/prof. J. Stride & Ms Anne Ayres of the School of Chemistry office by the due date. The .pdf file name must follow the following convention:

```
SURNAME_student#_program_primary supervisor surname_THESIS.pdf
Example: SMITH_3123456_Chem_Stride_THESIS.pdf
```

It is important to emphasise that the scientific content of the thesis is far more important than its appearance, and therefore time-consuming indulgence in the use of sophisticated text and graphics packages is not encouraged.

The documentation of data in appendices is permissible, but the thesis must be a standalone document that does not require explicit reference to the appendix. This must not be viewed as a means to extend the 50 thesis page limit. Reasonable examples of this are crystal information files (.cifs), detailed catalytic or NMR data, instrument schematics, and computational chemistry program outputs. Consult the Honours coordinator if you are unsure as to the validity of appendix material.

Final Seminar - The second seminar is a graded formal presentation that is held two weeks after submission of the Honours Thesis. This seminar comprises a 15 minute time limit presentation followed by up to 5 minutes of questions from the audience. The seminar and response to questions represents 11.25% of the overall course mark and is marked by the your examiners and academic staff in attendance; given the greater involvement of the examination committee in assessing your research project, these marks will be split in a ratio of 2:1 between the panel and the audience – equal weight will be given to both your formal presentation and your response to questions.

It is recommended that your final seminar has the following outline:

- a) Brief background to the project and its objectives.
- b) Description of the methods used.
- c) Description of key results and their impact.
- d) Conclusions and future project directions.

Do not try to cram too much into the allotted time. Do not try to put too much information on each slide. You are advised to spend sufficient time planning the talk and preparing Microsoft PowerPoint slides so that the audience can gain an appreciation of the project and research you have undertaken. A reasonable guide is one slide per minute of your presentation. It is advisable that you to practice your presentation with a familiar audience, such as your supervisor and research group, before you present to the School.

Oral examination - The oral examination aims to probe the understanding of the student in greater detail; evaluation will be made by the examination panel and will last no more than 15 minutes. The student's supervisor (or other person in lieu of the supervisor) may attend the examination as an observer but must not contribute the discussion or comment upon the proceedings. Failure to adhere to this will result in the observer being asked to leave the examination. You should be prepared to briefly (2-3 minutes) outline your thesis and the key findings of your project.
REGULATIONS FOR THESIS PREPARATION

1. **Line Spacing:** All text should be double spaced on A4 paper (210 mm x 297 mm).

2. **Text Size and Font:** Body text should be non-bold 12 point in size using a professional font, such as arial, arial narrow, courier, georgia, optima, sommet, times new roman or verdana. Titles and sub-titles may be larger than 12 point and in bold, underlined and/or italicised text.

3. **Page Format:** The margins on each sheet should be no less than 35 mm on the left-hand side, 15 mm on the right-hand side, 25 mm at the top and bottom.

4. **Figures, Schemes and Tables:** These should be placed close to where the text refers to them. They may be placed between pages of text, or in the body of the text.

5. **ChemDraw Images:** It is advisable to generate ChemDraw images using preset document settings (see File dropdown menu) such as ACS Document 1996 or RSC (1 Column) Document. These ensure readability when copied into word-processing software. Images from recent versions of ChemDraw can be copied directly into Microsoft Word without distortion. Older versions benefit from saving as a .TIFF image and inserting as a picture.

6. **Title Page:** The following information should appear on the title page
   - Subject of the thesis.
   - Author’s name.
   - Degree for which submission is made (Bachelor of Science (Honours) or Bachelor of Science (Advanced)).
   - Date of submission.
   - Supervisor.

7. **Abstract:** The title page should be followed by a single page abstract that contains a clear statement of experimental findings and conclusions.

8. **Introduction:** The introductory section should contain a clear statement of the aim of the investigation, together with a brief survey of relevant background information. It is not necessary to include large amounts of material that is readily available in standard textbooks.

9. **Length of Thesis:** The aim should be to produce a clearly written, properly documented and thoroughly organised thesis that occupies 30-50 pages. Theses exceeding 50 pages are not welcomed and over elaborate presentation of diagrams etc., is not necessary. Typically, thesis content beyond page 50 of the thesis will not be examined.

10. **References:** The style must be consistent and unambiguous. Each reference should be referred to as a number in the text as per standard Chemistry periodicals. Typical formats are those of ACS, RSC or Wiley-VCH journals. The following style is one suggested format:

11. **Page numbers:** Every page with printing (text, figures, appendices etc.) must be numbered.
12. **Thesis Binding (at student/supervisor descretion):** The binding should be of the simplest kind (blocked and pasted). The following is the regulation for higher degree thesis binding:

- The thesis shall be bound in boards, covered with bookcloth (buckram) or a similar binding fabric.
- The thesis shall be lettered on the spine as follows:
  - At the bottom; UNSW.
  - 70 mm from the bottom; the degree and year *e.g.* B.Sc. (Hons) 2013.
  - Evenly spaced between the degree and year and the top of the spine; the name of the author as initials and surname, *e.g.* J. A. Bloggs.
  - No further lettering or any decoration is required on the spine or anywhere else on the binding.
  - In the binding of theses which include mounted photographs, folded graphs, and so on, the leaves at the spine must be packed to ensure an even thickness of the thesis.

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**SUBMISSION OF A CORRECTED THESIS UPON COMPLETION OF HONOURS - IMPORTANT**

A final .pdf of your corrected thesis must be submitted to both A/Prof. Stride and Ms Anne Ayres of the School of Chemistry office within one week of your final presentation and oral examination. The .pdf file name must follow the following convention:

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SURNAME_student#_program_primary supervisor surname_FINAL THESIS.pdf
Example: SMITH_3123456_MedChem_Messerle_FINAL THESIS.pdf
```

Feedback in the form of annotated Honours theses will, if available, be issued to you after your oral. This should be acted on before your corrected thesis is submitted. Your final grade and Honours class **will not be** processed until you have submitted your completed, corrected, thesis. In extreme cases this will result in delayed graduation.

Any thesis binding is the financial responsibility of the Honours student. Supervisors are not expected to pay for thesis binding.
USEFUL ADVICE FOR THE DRAFTING OF HONOURS THESES

Each year, Honours theses are assessed by examiner panels. The following advice has been developed based on this experience and the noting of common errors. It is intended to assist future candidates submit the best thesis and to avoid such errors:

1. Latin phrases and abbreviations of Latin phrases must be set in italic type or, if in a section which is already italicised, set in non-italic type. For example: ‘in situ’. The list below shows some common Latin phrases you may need to use in your thesis:
   - ca.  cf.  e.g.  et al.  etc.  i.e.  in situ  inter alia  vide supra  via
   - Note the full stops and make sure you know the meaning of these phrases before you use them.

2. Letters used to represent physical quantities should be italicised, for example, \( m \) for mass, \( V_m \) for molar volume (note; ‘m’ for molar is not italicised), \( m/z \) for mass to charge ratio, \( k \) for a rate constant, \( K \) for an equilibrium constant, but note \( pK_a \) where only the \( K \) is italic.
   - Some terms used in chemical nomenclature are also set in italics, for example endo, exo, cis, trans.

3. When referring to a compound by number, a noun ‘qualifier’ is required prior to the number. The two major chemical societies suggest the following:
   - From the Instructions for Authors, American Chemical Society (as published in Journal of Organic Chemistry, 67 (1)) “Complex compounds with unduly lengthy or unwieldy names should be referred to by their functional class and structural number, e.g. ketone 23.”
   - From the Instructions for Authors, Royal Society of Chemistry (from the RSC website) “The key number for a compound may be used in the cursive text to avoid repetition of long chemical names; this device must not be used to excess. In general it is preferred if the key number is qualified by a partial name as in the following example: Pyolin 1 was oxidized by permanganate to the oxoacid 2, the methyl ester 3 of which with methylmagnesium iodide gave the normal product 4.”
   - NOTE: You should number ALL compounds whose structures are given in the thesis, and you should also provide a guide to substituent numbering for compounds central to your project.

4. References must be set out in a consistent format. Any commonly accepted referencing style is acceptable, however once you choose a style (formatting, abbreviation of journal name etc.) you must apply that style consistently. Any reference that you quote, you must have read, or if this is not the case, you must indicate otherwise (e.g. ‘abstract consulted’). Never use ‘et al.’ in the author list for a reference in the list of references. The use of ‘et al.’ is only permissible when listing authors in the body of your thesis, but the actual reference to the document must list all authors. Experimental and spectroscopic details must also be reported using a consistent and acceptable format such as those used in RSC and ACS journals.

5. Check the names of compounds generated by chemical structure drawing programs. They can be incorrect or not conform to IUPAC recommendations.

6. All raw data must be reported in a synthetic procedure, even one that does not give the desired product. It is not sufficient to simply say that the process did not yield the desired product. For example, spectroscopic data may be given. Further, it is not sufficient to indicate that a given number of components were identified by GC/MS. The retention times (and the column and conditions) must be specified, as well as the observed ions. In other words, all quantitative data from chromatography (including GC/MS), spectroscopy or the like must be given. If the
7. Synthetic projects are dramatically affected by having the correct amount of detail in the results and discussion. This content should not be a repeat of the experimental but should include sufficient detail to indicate that the reaction was completed successfully, identifying key features where appropriate. Yields and m.p., for example, are really not necessary (unless either is notable, which is highly unlikely except for a particularly novel compound) and experimental details should be limited to when it suits the discussion. A hypothetical example where a reaction did not go well but the product could still be isolated is given below:

"Phenylalanine 1 was treated with acetic anhydride under basic aqueous conditions to give the corresponding acetamide 2 (Scheme 1). A proton NMR spectrum of the crude reaction mixture indicated the presence of both the starting material 1 and product 2 in a ca. 1:1 ratio. This is exemplified by the presence of signals of approximately equal integration at 3.45 and 4.40 ppm, corresponding to the alpha protons of the starting material 1 and product 2 respectively. Partitioning this reaction mixture between ethyl acetate and dilute aqueous acid permitted separation of the amino acid derivative 2. The spectroscopic and physical data for 2 are consistent with those previously reported.2,3*

8. Make sure that figures and drawings are of sufficient size that any significant aspect of the figure is clearly visible to the reader.

9. If you make frequent use of abbreviations and acronyms it is desirable to include a table of abbreviations near the front of your thesis. It may also be desirable to include a fold-out page listing structures of compounds referred to frequently in the text.
Abstract, Thesis Format and Presentation = 20% of Thesis Mark
- Quality of Abstract
- Arrangement and clarity of presentation
- English expression and spelling
- Quality of figures and illustrations
- Formatting of references
- Editing, formatting, and general impression

Introduction and Literature Review = 20% of Thesis Mark
- Level of presentation, extent and relevance
- Critical assessment of the literature
- Referencing
- Establishment of project aims and methodology

Discussion and Conclusions = 30% of Thesis Mark
- Level of understanding
- Interpretation of results and sophistication of analysis
- Handling and identification of errors
- Comparison with other data
- Achievements with respect to project aims

Experimental = 10% of Thesis Mark
- Completeness, accuracy and clarity of experimental section

Results/Work Effort = 20% of Thesis Mark

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15 This is a general guide. It is important to acknowledge that particular types of thesis will be weighted differently, e.g. a synthetic project may place greater emphasis on the experimental section than a measurement directed thesis.
85 and above (1st)
Student has an excellent command of the theory and practice of the discipline. Student works independently and completes stages of the project punctually with good time management. Student demonstrates independence of thought; problem solves and makes a strong contribution to the direction of the research, as evidenced in seminar-defence. Student demonstrates the key outcomes of the project, not simply a list of outcomes, and how these contribute to research in the broader area.

75-84 (2:1)
Student expresses a command of the theory and practice of the discipline. Student demonstrates an ability to conduct work at an independent level and complete tasks on time. Student understands the factual basis of the project and shows some initiative but is reliant on other people for ideas and techniques, as evidenced in seminar-defence. The student demonstrates some key outcomes of the project but tends toward an indiscriminate list of experiments without placing any emphasis on the importance to research in the broader area.

65-74 (2:2)
Student shows proficiency in the theory and practice of their discipline in the project but has not developed independence of thought, practical mastery or clarity of presentation. Student shows adequate understanding of the topic but largely follows the direction of the supervisor. The student fails to grasp research and tends toward routine processes/reactions. Student shows a lack of understanding of the project or its importance in a broader context. When asked, the student simply lists research outcomes and fails to make any correlation with research elsewhere.

50-64 (3rd)
The student completes the project but at a standard that barely meets Honours criteria. The student’s understanding of the topic is limited and they demonstrate little or no independence of thought, as evidenced in seminar-defence. Project is clearly supervisor driven. Student does not appreciate research and tends toward routine processes. The student makes few contributions during Honours year and, when asked, reels off a list of experiments.

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This is particularly relevant to the assessment of the final seminar-defence.