



Australian  
National  
University

# **BIOL4001F**

## **Biology Honours Program**

# **BIOL8701**

## **Master Research Project**

### Information for Students, Supervisors & Examiners

Updated version [June 2015](#)

Jan-Nov Convener: Roderick Dewar  
T +61 2 6125 2447  
E [Roderick.Dewar@anu.edu.au](mailto:Roderick.Dewar@anu.edu.au)

Jul-May Convener: Giel Van Dooren  
T +61 2 6125 0665  
E [Giel.vanDooren@anu.edu.au](mailto:Giel.vanDooren@anu.edu.au)

**Biology Teaching and Learning**  
*Research School of Biology*  
*ANU College of Medicine, Biology and Environment*

The Australian National University  
Acton ACT 0200 Australia  
*General Enquiries:*  
E [rsb.studentadmin@anu.edu.au](mailto:rsb.studentadmin@anu.edu.au)  
T +61 2 6125 9090  
[biology.anu.edu.au/btlc/](http://biology.anu.edu.au/btlc/)



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## I. Welcome

The Honours/Masters research year is an incredibly exciting, stimulating and challenging experience. Our aim is to encourage you to develop a deep enthusiasm for, and appreciation of, scientific discovery. You will be part of a research group and a valued member of the scientific community. You will develop skills in laboratory or field techniques, research planning, inductive reasoning, literature searching, storage and retrieval, and written and oral communication. You will also advance your knowledge and understanding of contemporary biology.

We hope the year will be a fruitful and enjoyable personal journey in which you will learn much about your academic and personal strengths and weaknesses. This will also be a year of decision-making; the course is a great training ground for many careers, and you will be advised about future professional activities and career directions.

The Course Convener and the Course Committee will assist you in any way they can. Please let us know as soon as possible if you encounter any problems or difficulties. We also welcome your suggestions for how to improve the course.

### People you may need:

#### **Course Conveners**

*Jan-Nov Convener: Roderick Dewar*

T +61 2 6125 2447

E Roderick.Dewar@anu.edu.au

*Jul-May Convener: Giel Van Dooren*

T +61 2 6125 0665

E Giel.vanDooren@anu.edu.au

#### **Course Committee**

There are four committee members: one from each of the *Division of Ecology, Evolution & Genetics*, the *Division of Biomedical Sciences & Biochemistry*, and the *Division of Plant Sciences* in the Research School of Biology, and one from the *John Curtin School of Medical Research*. Please refer to the Research School of Biology website (<http://intranet.rsb.anu.edu.au/Committees/Honours/>) for the names of the Committee members.

#### **General enquiries**

Please direct any administrative enquiries to:

*Patricia Seddon, Student Administrator, Biology Teaching & Learning*

rsb.studentadmin@anu.edu.au

T 6125 9090

F 6125 1928

#### **Heads and Deputy Heads of Biology Teaching & Learning:**

If you are unable to contact any of the above people, please contact:

*Dave Rowell*

T 6125 2881

E David.Rowell@anu.edu.au

or *Susan Howitt*

T 6125 4356

E Susan.Howitt@anu.edu.au

**Honours/Masters Wattle website:** you can access this by logging in via <https://wattle.anu.edu.au/>. The site is called *BIOL4001F Biology Honours/BIOL8701 Master Research Project* or *BIOL4001F Biology Midyear Honours/BIOL8701 Master Research Project* and contains all the most current information, including forms for assessment items. It is up to you to check the website regularly to remain up-to-date with current information.

This site also includes a discussion forum. The Honours/Masters website and forum is a student-only space and no supervisors have been added as participants. So it is up to you to pass on any information posted here onto your supervisor. However, both you and your supervisor(s) will often be sent information and reminders directly by email.

**For Honours students only** - after logging in to Wattle you will see you also have access to a website called **Science Honours Thesis Submission**; this site contains the College Honours Guidelines, Timeline and Submission Guidelines.

Please also see the **College website** for general Honours information at [http://cmbe-cpms.anu.edu.au/study/more-information/current-anu-students#acton-tabs-link--tabs-0-row\\_2-3](http://cmbe-cpms.anu.edu.au/study/more-information/current-anu-students#acton-tabs-link--tabs-0-row_2-3).

This site contains links to the College Honours Guidelines, Honours Handbook, Timeline and Submission Guidelines. To the best of our knowledge, all information in this handbook is consistent with the College information.

If **work-related problems** arise during the year, it is important that they are resolved as soon as they arise. The first port of call for discussion of such problems is your supervisor(s). If further discussion is required, you should contact your local member of the Course Committee or the Course Convener.

## II. Timetable & Milestones

The Timetable given to you with this handbook was current at the time. There may be changes during the year and **the most recent Timetable** will be available on the **Honours/Masters Wattle website** and the **College website**.

The ANU Colleges of Science have defined **Milestones** that must be completed by all students in the ANU College of Medicine, Biology and Environment and the ANU College of Physical and Mathematical Sciences (CMBE/CPMS).

The **Milestone Form** will be kept on file in the Biology Teaching and Learning Office. When you submit items for assessment or reports, you will need to sign off on your form. In the event that you request an extension, the Director of Science Education will require that your Milestone Form is up to date and shows that you have worked to the expected deadlines.

### III. The Course and its Assessment

The central feature of the course is a **research project** that you will plan and execute under the guidance of your supervisor(s), and subsequently report on both verbally and in writing. The course includes a mix of assessed and non-assessed components designed to help you along with the central task of conducting and reporting your research.

Assessment is conducted by a panel of three examiners, two of whom reflect the research focus of your project; the third examiner will generally have only peripheral expertise in the area to ensure you aim your reports at the general biologist. They will be looking for **quality** and clarity of presentation in your work, rather than quantity; and they will be assessing your **understanding** of the background, experimental strategy and implications of your work, rather than your results *per se*.

This section takes you through the components of the course and how they are assessed.

#### A Overview of your research year

The year is based solely on independent research. The program covers approximately nine months.

You will spend much of the first six weeks attending introductory **Workshops and OH&S courses**, and developing your research plan in the form of a **Grant Proposal**. The goal of the workshops and courses is to provide you with important knowledge and skills that you will need for your research project; attendance at many of the workshops and courses is compulsory. Projects should be planned so that the data collection phase of the project makes up about six months. This gives you plenty of time at the end of the program to write a high quality **Thesis**, which is the culmination of your research findings.

You will also write a **Mid-term Progress Report** and give two seminars: an **Initial Seminar** early in the year in which you will introduce peers and academics to your research plan; and a **Final Seminar** in which you will summarise your research findings.

As a member of a research laboratory, you will also participate in your research group's regular Lab Chats and other activities such as Journal Clubs. You will also attend a minimum of 10 **Departmental or School Seminars** during the year and keep a seminar log book. We strongly encourage you to attend seminars in many different areas (including outside RSB/JCSMR), to increase your breadth of knowledge and understanding of contemporary biology and the process of scientific discovery.

The other key events are your three meetings with your examiners: the **Initial Meeting** (after you have submitted your Grant Proposal) to discuss your research plan, the **Mid-term Meeting** (after you have submitted your Mid-term Progress Report) to discuss your progress, and the **Oral Discussion of the Thesis** (after you have submitted your thesis).

As already mentioned in section II, you will mark your progress through the year by signing off on the completion of **Milestones** (of which there are five in all, see Table on p.4).

Overall, you will learn how to report your findings in a clear and unambiguous manner, and you will develop the ability to critically assess the research of others. You should gain great satisfaction in producing a thesis. Some students go on to publish their work in peer-reviewed journals.

## **B Course components and how they are assessed**

Here is a summary of how the different components of the course will be assessed (also indicating *Milestones 1-5*), given in chronological order through the year (see Timetable for actual dates and times). The two components that are formally assessed are the Grant Proposal and the Thesis & Oral Discussion (underlined). Note that the non-assessed components are still course requirements that must be satisfactorily completed (CRS).

<b>Component</b>	<b>Honours</b>	<b>Masters</b>
Workshops and OH&S courses	CRS <sup>1</sup>	CRS
Initial Student Seminar ( <i>Milestone #1</i> )	CRS	CRS
<u>Grant Proposal</u> ( <i>Milestone #2</i> ) <sup>2</sup>	<u>15%</u>	CRS
Initial Meeting with examiners	CRS	CRS
Mid-term Progress Report ( <i>Milestone #3</i> )	CRS	CRS
Mid-term Meeting with examiners	CRS	CRS
Final Student Seminar	CRS	CRS
Completion Plan of Research Work ( <i>Milestone #4</i> )	CRS	CRS
Draft Thesis ( <i>Milestone #5</i> )	CRS	CRS
Departmental Seminar log book	CRS	CRS
<u>Thesis &amp; Oral Discussion with examiners</u> <sup>2</sup>	<u>85%</u>	<u>100%</u>

<sup>1</sup> CRS = Course Requirement Satisfied

<sup>2</sup> The marks for these assessed components will be a consensus reached by all 3 examiners.

The following gives an overview of each component. Further details on how to prepare your seminars and written reports are given later in section III-D.

**Workshops and OH&S courses:** throughout the year, but mainly during the first six weeks. Workshops are listed on the Timetable. Attendance at many workshops is compulsory for all students, as noted in the Timetable. Attendance at other workshops is decided by your supervisor, who is best able to determine whether you will need these skills during the year. Students may attend any non-compulsory workshop they wish. **OH&S courses** (e.g. Chemical Safety, Biological Safety, Ionizing Radiation Safety, Gene Technology and Animal Handling) must be undertaken where relevant (see Timetable) and the exams must be passed at the beginning of the program. Failure to do so may incur a \$100 fine per failed course (charged to your supervisor) and lead to you being unable to conduct laboratory work.

**Initial Seminar** (*Milestone #1*): a 15 minute presentation followed by 5 minutes discussion, on your proposed research. This is the first opportunity for your fellow students and academic staff (including your examiners) to learn about the research you plan to do, and for you to get feedback from them on aspects such as the feasibility of your research plan. **More details on how to prepare the Initial Seminar are given below in section III-D1.**

**Grant Proposal** (*Milestone #2*): this is an assessed component for Honours students (15%), but a non-assessed (though compulsory) component for Masters students. It is a written research plan modelled on a shortened version of an ARC or NHMRC grant application. The Proposal Form is available on the Wattle website (see also Appendix 3). **More details on how to prepare the Grant Proposal are given below in section III-D2.**

**Initial Meeting with examiners:** this will occur about one month after you submit your Grant Proposal. The mark for the Grant Proposal will be determined before the meeting. This is an opportunity for you to get to know your examiners for the first time, to discuss your research plan together, and to identify any potential concerns. Your supervisor will arrange this meeting and will also be present.



**Mid-term Progress Report (Milestone #3):** this short (3-4 page) document, detailing your project and the progress you have achieved, should be submitted to the Biology Teaching & Learning Centre (see Timetable for due date). The report is not meant to be a comprehensive description of everything you have done but a concise summary of progress to date. There is no set format but you might structure it, for example, around the specific research aims or questions as set out in your Grant Proposal. It provides a basis for the discussion with your examiners at the Mid-term Progress Meeting.

**Mid-term Progress Meeting:** with your examiners and supervisor(s). Very few projects proceed exactly as planned, so this meeting is an important forum to get feedback from your examiners and discuss any problems that have arisen. The Biology Teaching & Learning Centre will forward your Mid-term Progress Report to your examiners and supervisor(s) prior to the meeting; you can also take along extra results and figures to show your examiners. Your supervisor will arrange this meeting.

**Final Seminar:** a 15 minute presentation followed by 5 minutes discussion, on your research findings to date. This is an opportunity for fellow students and academic staff to find out how your research project has gone, and a final opportunity for you to get feedback from them that you can then incorporate into your thesis. **More details on how to prepare the Final Seminar are given below in section III-D1.**

**Completion Plan of Research Work (Milestone #4):** one month before submission of your thesis, you and your supervisor(s) should agree and sign off on a completion plan for all major data collection, field work, experiments, calculations and/or background reading that are required for submission.

**Draft Thesis (Milestone #5):** two weeks before submission of your thesis, you will have completed a draft of your thesis, submitted it to your supervisor(s), and received comments back from your supervisor(s). This is the **one and only time** your supervisor(s) will be allowed to give you written comments on a draft of your thesis. **Important guidelines on the level of input to the thesis from your supervisor are given below in section IV-B1.**

**Departmental Seminar log book:** you will attend **seminars** within and outside of your Division in RSB or JCSMR. Attendance at a minimum of TEN seminars is required, but we strongly recommend you attend many more. You will need to keep a **Log Book** of the seminars, in which you should record the name of the speaker, the date and the venue. You will either take notes during the seminar or write a paragraph summarising the talk at the end of the seminar (these should be hand written, there is no need to type them). Your supervisor (or, if unavailable, another member of academic staff) should sign and date each entry to confirm that you attended. The Log Book must be handed in to the Biology Teaching & Learning Centre on or before the thesis due date. In the middle of the year you will be asked to submit the Log Book for mid-term checking.

We strongly encourage you to attend seminars in different areas (which may include seminars outside RSB/JCSMR) to increase your breadth of knowledge and understanding of contemporary biology and the process of scientific discovery. It is up to you to find out which seminars to attend, but your supervisor(s) and other staff in your group can advise you.

**Thesis & Oral Discussion:** the thesis is the formal write-up of your research project. About two weeks after submission, an oral discussion of your work is held with your examiners; your supervisor will arrange this. The thesis and oral are 85% of the final Honours mark, and 100% of the final Masters mark. The thesis and oral are not given separate marks; the oral discussion is used as an aid in assessing the thesis and an overall mark is given to "thesis plus oral". The criteria used to arrive at a mark for the thesis/oral are set out in Appendix 4. **More details on how to prepare your Thesis are given below in section III-D3.**

## **C Staying on top of things**

### **C1 Managing your time**

Learning how to manage your time well is critical and this means good forward planning: setting clear interim goals, leaving plenty of time for preparing reports, seminars and, especially, the thesis.

Whether you are running experiments in the laboratory or glasshouse, or doing fieldwork or computational work, you may find that your hours are not the normal nine to five, five days a week. In research, hours of work are determined by the type of work being conducted. If you work consistently and manage your time well, you should be able to maintain a healthy workload.

This also means taking reasonable time away from the university – the equivalent of most weekends and probably two weeks holiday if you want. In fact you are strongly encouraged to do so; taking regular breaks helps keep a sense of perspective that will not only help to ensure your own well-being but will also, ultimately, benefit the quality of your thesis.

If you find you are having problems with maintaining work hours that are acceptable to you, discuss the issue with your supervisor(s), your local Committee member, or the Convener.

### **C2 Extensions and penalties for late submissions**

An extension to a deadline may be granted on medical grounds requiring more than three days away from work, or for other compelling personal reasons beyond your control. You must apply in writing to the Convener **as soon as a problem arises**, clearly explaining the basis of your request. Extension requests based on medical grounds must be accompanied by a Doctor's Certificate. No extensions will be granted if your Milestone Report Form is not up-to-date.

The decision to grant extensions rests with the Course Convener in consultation with the Course Committee, although extensions beyond two weeks also require the approval of the Director of Science Education. Support from your supervisor(s) will be taken into account. Submission **after** the revised deadline (i.e. when an extension has been granted) will be penalised (see below).

Extensions are not granted simply to complete the work originally planned. Almost all research projects run into unexpected problems and delays, requiring some aspects of the planned work to be curtailed. This is a normal part of your learning experience. You will be assessed on your analytical skills, critical thinking and understanding, not on your specific results. There are many examples of outstanding theses that have emerged from incomplete projects, in which students have discussed the difficulties encountered.

From January 1, 2015, a new ANU-wide policy for late assessments comes into force. A Grant Proposal or Thesis will be marked down by 5% per working day or part thereof after the deadline. For example, if an item of assessment is submitted two days late, the mark for the item will be reduced by 10%, so if the recommended mark is 75% then the actual mark will be 65%. Thus submission of a thesis even just one day late is likely to result in a lower grade.

## **D How to prepare your seminars and reports**

### **D1 Seminars**

You will present two research-related seminars during the year.

The **Initial Seminar** is a brief survey of the literature and an outline of your proposed research project, including the hypotheses being tested and expected outcomes. For some projects it will also be important to describe the experimental strategies to be employed. Your supervisor(s) will provide feedback on your performance in the initial seminar – content, organisation, presentation, style, etc.

The **Final Seminar** is an account of what you have achieved during the year to date, and provides an opportunity for you to receive feedback before your thesis is submitted.

Both seminars last 15 minutes followed by 5 minutes for questions. Supervisors are expected to attend both presentations given by their students. Examiners are also expected to attend the seminars of the students they are examining. However, not all supervisors and examiners may be able to attend; in the event of an emergency the supervisor must arrange for another staff member to attend and provide feedback to the student.

#### **Initial Seminar**

You should attend the workshop dealing with oral and audio-visual presentation of material for a seminar. The three main points to clearly explain in your talk are: **why** you are proposing to study the particular topic, **how** you propose to do this within the available time, and **what sort of conclusions** you should be able to reach. You will have 15 minutes to present your proposal, followed by 5 minutes for questions. It is recognised that you may not yet be familiar with many of the methods you will be using. Your supervisor may field such questions if necessary.

Remember that you will have a **general audience** of staff and students, not just specialists in your area, so you must give the background to your project: do not assume people know what you are doing or why you are doing it. Keep audio-visuals simple; it is the content, not the use of fancy graphics, which is important. Do not go into unnecessary detail – the audience will have an opportunity to ask questions if something was unclear:

- Keep it simple and focused on the main points
- Keep the amount of text on visuals to a minimum (key headings & information only)
- The visuals should prompt you and guide the audience
- Use a large font on visuals (e.g. maximum 6-8 words across screen & small margins)
- If you speak quietly then use a microphone
- Try to present the talk without reading it - this is much more engaging
- Give a brief BACKGROUND, leading from the general issues
- Where possible use photographs or diagrams
- State your HYPOTHESES
- Outline your RESEARCH PLAN and methods (keep details of methods brief, especially if standard procedures are used)
- State how the data will be ANALYSED
- State how the results should lead to testing your hypotheses
- CONCLUSIONS: describe what your project will reveal, perhaps present intended timetable
- QUESTIONS: anticipate questions and prepare answers. If you do not know the answer, then say so!
- PRACTISE with an audience, including setting up the room and equipment.

## **Final Seminar**

The final seminar is similar to the initial seminar, but the emphasis should be on the results and conclusions you have reached so far. Again, remember to pitch it to a **general audience**, so don't forget to give the background and reasons for what you have done.

The final seminar is held several weeks before the thesis is due, so that you can incorporate feedback in your thesis; the timing also means that the audience will not expect you to have finalised all of your analyses.

## **D2 Grant Proposal**

During the first few weeks of the course, you will prepare a written research plan in the form of a Grant Proposal. This exercise is valuable to you in three ways:

- (1) You gain experience writing a grant proposal, which is important if you plan to continue with postgraduate research.
- (2) A grant proposal must explain why the research is important and show that it can be carried out within the constraints of time and money. Thus a good Grant Proposal requires that you have understood the theoretical background to the research **and** planned the practical aspects of the project. Both aspects are important to the success of your project, so writing the Grant Proposal will help you have a productive year.
- (3) Information and literature in the Grant Proposal will usually form a substantial part of the first chapter of your thesis.

In the first week a workshop will be given on how to write a Grant Proposal.

The Grant Proposal exercise has been modeled on an Australian Research Council (ARC) or National Health & Medical Research (NHMRC) grant application. You are required to fill out a Grant Proposal Form (available on the Wattle website, see also Appendix 3) which includes summary sections (1-7) as well as the research proposal itself (section 8). The research proposal must be succinct; please follow the formatting guidelines given at the top of section 8 of the Grant Proposal Form.

You are encouraged to discuss the content of your Grant Proposal frequently with your supervisor(s) and other academic staff. Getting feedback well before the Grant Proposal is due can make a big difference to the mark awarded. However, written comments from your supervisor will be restricted to **general comments** on TWO DRAFTS with regard to writing style, organization and content, i.e. no detailed corrections (see section IV-B1).

The Grant Proposal Form is available on Wattle; please use it to complete your proposal. **Do not alter or delete the instructions or the supervisor's declaration on the template.** The summary sections (1-7) of the form are self-explanatory. In completing the 10-page research proposal, use the subheadings listed and follow these guidelines:

- The **introduction** should review the primary research literature relevant to your proposed research, so that the importance of your research can be put in the context of what is already known. It should include a section on your study system or species.
- You should describe the **specific aims** of the project in a little more detail than appears in the summary section 6. If you wish, you can formulate your aims in terms of the questions that you seek to answer.
- You should explain the **significance** of your proposed research: why it is important and

interesting.

- The **research plan** should explain how you are going to achieve your aims. This includes what methods and equipment you will use. You should list the specific observations, experiments or data collation that you will carry out, and explain how analysis of the resulting data will answer the questions you have raised. You should list explicitly what hypotheses you aim to test, and how your observations or experiments can test between alternative hypotheses. You should also briefly explain any statistical analyses you will carry out.
- The **timetable** lists when each component of your research plan will be carried out. One possible format is a Gantt Chart. Data collection should normally finish at least two months before your thesis is due.
- In the **reference** section, list only the literature to which you have referred in the application. Numbered or non-numbered citation styles may be used (in contrast to the thesis, where a numbered citation system should **not** be used).

Please ensure that your **Grant Proposal is based on what you can realistically achieve during the year**, not on what you would like to do given unlimited time and resources! Unrealistic claims are not treated kindly by reviewers of grant applications to ARC or NHMRC. More importantly for you, writing the proposal is designed to help you plan the research you will actually carry out.

Examples of well written Grant Proposals will be provided on Wattle.

When assessing your proposal, the examiners will give you written feedback in the form of answers to the following questions:

1. *What are the positive features of the proposal?*
2. *Have the aims/hypotheses of the proposed research been clearly presented?*
3. *Has the basic/applied significance of the proposed research been described?*
4. *Has sufficient and appropriate background information been presented?*
5. *Have the experimental design and methods been adequately described and justified?*
6. *Is the proposal well organised, written in a clear and concise manner, and correctly formatted?*

See also the Criteria for Assessment of the Grant Proposal given in Appendix 3.

Note: The assessment of the Grant Proposal is based on the written proposal that you submit; it is not based on your performance in the Initial Meeting with your examiners. For Masters students, the assessment of the Grant Proposal is for feedback purposes only; it does not contribute to the final mark.

### **Submission of the Grant Proposal**

Submit **ONE printed copy** to the Biology Teaching & Learning Centre. Email a digital PDF copy to Patti Seddon (Patricia.Seddon@anu.edu.au); she will forward the proposal to your examiners.

## **D3 Thesis**

Your thesis is the culmination of your research. You should write your thesis for **general biologists** rather than specialists in your field. Examiners are much more impressed with quality than quantity; copious data – even if publishable – by themselves do not guarantee a high grade. Aim for a well-written and well-argued thesis rather than trying to present too much. In other words, tell a coherent story. Examiners are looking for evidence of clear understanding in the design and interpretation of your research.

Presentation of the thesis is very important. A workshop on writing a thesis will be held two to three months before the submission date, in which you will be given detailed advice on the format of the thesis, its preparation and how it will be assessed. In addition, the ANU's Academic Skills and Learning Centre (<https://academicskills.anu.edu.au/>) offers online resources on academic writing skills, and also runs relevant workshops; we strongly encourage you to use these resources. You can also ask your supervisor to suggest recent examples of successful theses in your field. These may be borrowed for up to two weeks from the BTLC thesis library, signed out to your supervisor; just ask your supervisor to email the requested thesis titles to [rsb.studentadmin@anu.edu.au](mailto:rsb.studentadmin@anu.edu.au) and you can then pick them up. Examples of well written theses will also be provided on Wattle.

**Please read the important guidelines on the level of input to the thesis from your supervisor given below in section IV-B1.**

**The thesis must respect the following format:**

- Printing: double-sided A4 paper
- Font: Times, 12 point
- Spacing: 1.5 lines
- Margins: Mirrored, 3 cm on the inside; others 2 cm (because 1 of the 4 unbound copies you submit is subsequently bound and held in the BTLC thesis library)
- Text limit: 10,000 words excluding Abstract, Methods, References, Figures (and legends), Tables and Appendices. *Provide the word count of the Introduction, Results and Discussion chapters on the Title Page of the Thesis.*

Organisation of the thesis within these limits is up to you, and depends to a large extent on the nature of the project – however, the thesis should contain a clearly-identified final Discussion chapter (see below). Consult your supervisor(s) and the guidelines below for structuring your thesis.

These page/text restrictions should be viewed as *upper limits and not goals*. You should strive to write as succinctly as possible. Do not use Appendices for important information that should appear in the Methods or Results. As noted below, examiners are not required to read the Appendices. A thesis that exceeds the upper limits will be judged more carefully for succinctness and selectivity of material.

### **Guidelines for thesis structure**

The internal arrangement of the thesis is up to you but it should include a series of chapters that are preceded by a Title Page (including word count), Table of Contents, Acknowledgements, Abbreviations page and an Abstract. The Abstract should briefly describe the background to the project, aims, methods, results and conclusions, with the emphasis being on results.

The first chapter, the **Introduction**, should give the background and reasons for the research. It should establish the experimental hypotheses and outline the experimental approach being used. Your Grant Proposal will be helpful in composing an Introduction.

Subsequent chapters may be organised into separate chapters on **Methods**, **Results** and **Discussion**, or thematically, with each chapter containing its own Methods, Results and Summary sections. In either case, the **final chapter of the thesis should be a Discussion**, which provides an overview of the research outcomes and future directions. This chapter is uniquely your statement; your supervisor will not see it. Discuss the organisation of your thesis with your supervisor; the following suggestions apply to either structure.

The **Methods** should be presented in the briefest possible form consistent with a description enabling repetition of the work by others. Detailed accounts of published techniques should not be included, but if a description of the fine details of techniques is necessary this should be included in Appendices (see below). This chapter should include concise descriptions of

study organisms, locations and study sites, and other relevant information on procedures. Where modifications to published methods were used, these should be presented formally, in journal style, and should include compositions of the solutions used. Laboratory jargon should be avoided.

The **Results** should summarise the main findings. Results should be presented in the text, with reference to Figures and Tables as appropriate. The Results should also include analyses of the data and the conclusions that you can draw from the analyses. Results should not include comparison with other people's work, nor comments on the wider significance and applicability of your work (this is done in the Discussion).

The final chapter, the **Discussion**, should draw all observations and experiments together, stating the main findings, pointing out their significance, drawing conclusions from them and relating these back to the original aims and hypotheses. This is also the place where the findings should be related to other people's published work as described in the Introduction, and where suggestions for future research should be offered.

Your supervisor(s) can give you written **general comments** on only ONE DRAFT of the thesis, except the Discussion chapter for which they can only comment on a 1-2 page outline summary (see **section IV-B1** below for more details).

### **References**

References at the end of the thesis should follow the following format. You will learn more about referencing and bibliographies in your EndNote Course.

*For example:*

- Gullan, P.J. & P. S. Cranston. 1994. *The Insects: An Outline of Entomology*. Chapman and Hall, London. [*For a book*]
- Kalish, J.M. 1995. Radiocarbon and fish biology. In: Secor, D.A., J.M. Dean and S.E. Campana (eds). *Recent Developments in Fish Otolith Research*. University of South Carolina Press, pp 637 -653. [*For book section*]
- Mulder, R. 1993. *Evolutionary ecology of the mating system of superb fairy-wrens*. PhD thesis, Australian National University. [*For thesis*]
- Peakall, R., P. E. Smouse & D. R. Huff. 1995. Evolutionary implications of allozyme and RAPD variation in diploid populations of Buffalo grass. (*Buchloe dactyloides* (Nutt. Engelm.)). *Molecular Ecology* 4: 135-147. [*For research paper*]

Citations in the text should take the form: "... is astonishing (Kalish 1995)" or "Gullan and Cranston (1994) emphasise that ....". "Peakall et al. (1995)" may be used in the text where a paper has three or more authors but the full reference must be given in the References. If several papers are cited in the same parentheses, each should be separated from the next by a semi-colon and be listed in chronological order: "(Heinsohn et al. 1990; Heinsohn 1992, 1995; Cockburn & Dunn 1994; Magrath & Yezerinac 1997)". The forms "(D. C. D. Happold & M. Happold, unpublished data)" or "(M. Aston, pers. comm.)" are not repeated in the References. There are many variations in the form of citation, but the most important consideration is that there is constancy of style, preciseness and accuracy of citation detail, and inclusion of all references given in the text in the References (and vice-versa). Do not use a numbered citation system. Although citation accuracy may seem a trivial detail, it is a good indicator to the carefulness and precision of a student's work.

### **Appendices**

Supplementary material may be placed in Appendices at the end of the thesis. This is the place for anything that is not essential to convey a critical understanding of the project, but which may be useful to anyone following up your research. Such material may include long protocols, tables of "raw" results or detailed background information. Appendices do not count towards the thesis limits, but examiners are not required to read them. Important results should be in the body of the thesis, not in Appendices.

## **Conventions**

There are a number of scientific conventions that you should follow when presenting your work:

### *Units*

You should use SI units as specified by the International System of Units for exact measurements of physical quantities and, as far as practicable, elsewhere.

### *Mathematical Formulae*

These should be carefully presented with symbols in correct alignment and adequately spaced. Each long formula should be numbered and displayed separated from the text by at least two line spaces above and below.

### *Enzyme Nomenclature*

The names of enzymes should conform to the Recommendations of the Nomenclature Committee of the IUB on the Nomenclature Classification of Enzymes as published in "Enzyme Nomenclature 1978" (Academic Press, Inc., New York, 1979).

### *Chemical Nomenclature*

The nomenclature of compounds such as amino acids, carbohydrates, lipids, steroids, vitamins, etc should follow the recommendations of the IUPAC-IUB Commission on Biochemical Nomenclature. Other biologically active compounds, such as metabolic inhibitors, plant growth regulators, buffers, pesticides, etc should be referred to once by their correct chemical name (which is in accordance with IUPAC Rules of Chemical Nomenclature) and then by their most widely accepted common name. Where there is no common name, trade names or letter abbreviations of the chemical may be used.

### *Statistical Evaluation of Results*

Statistical summary and evaluation of data are crucial to interpreting results, and gaining knowledge and experience in using statistics correctly is an important part of research. Statistical methods required can range from simple descriptive statistics to extremely complex evaluative statistics. Furthermore, if you do not plan your research carefully, your results may not be amenable to statistical evaluation and so may be meaningless. It is therefore critical that you consider statistical analyses when you plan your research, not simply after you have finished it. You must consult your supervisor, or others, about statistical methods when you are planning your research; most likely you will also have to learn about new statistical methods.

Statistical summaries of data should include the sample size, a measure of the "average" (often the mean), and a measure of the variability about the average (often the standard deviation) or a measure of the precision of the estimate of the average (often the standard error). Statistical tests of hypotheses must give descriptive information (as above, or in a Table or Figure), together with details of the type of test, the value of test statistic (e.g. F, t,  $\chi^2$  etc), the degrees of freedom and the probability value.

There is a compulsory seminar on statistics and experimental design early in the year and a two day workshop after about two months. All students may attend both sessions; consult with your supervisor about whether you should attend the two day workshop.

### *Tables*

Tables must be numbered throughout the whole thesis (1, 2, 3 ...) or by chapter (1.1, 1.2, 1.3, 2.1, 2.2, 2.3 ...). Each must be accompanied by a caption, placed above the table, which includes sufficient detail that the table can be understood without recourse to the text. Footnotes should be kept to a minimum and be reserved for specific items in columns. Each table must be referred to in the text. Do not present the same data in both tabular and graphic forms. The data in short tables can frequently be incorporated into the text as a sentence or as a brief untitled tabulation. It is worthwhile looking at a selection of



international journals as a means of learning how to design scientific tables.

### *Figures*

Each figure or drawing should be numbered as for tables, but separately from them. Figure legends are placed below the figure, and include a title and explanatory information (including abbreviations) enabling the figure to be understood without referring to the text. Figures may be embedded within the text or occupy their own page. Lettering should be in sans-serif type with only the first letter of the first word of any proper name capitalized, and of sufficient size that it is legible and appropriately sized if reduction is necessary. The symbols + or x should be avoided. Explanations of symbols can be given in the figure legend or in a separate legend within the figure. Lettering of graphs should be kept to a minimum as excessive lettering within the frame of a graph makes the lines difficult to decipher. Legends to axes should state the quantity being measured and be followed by the appropriate SI units in parentheses. Make sure you explain any measures of variation of the data. Notation of statistical significance (usually an asterisk) should be clearly described in the figure legend. As for tables, it is worthwhile to examine figures in a series of journals; there is more to designing figures than you might realise.

**Do not interpret the result in the figure legend;** the place for this is in the text (eg The results in Figure XX show...).

### *Taxonomic Material*

Taxonomic nomenclature should conform to the Articles of the most recent "International Code of Botanical Nomenclature" or "International Code of Zoological Nomenclature". Consult a taxonomist if you are confused.

### **Submission of thesis**

Submit **FOUR unbound printed copies** to the Biology Teaching & Learning Centre on or before the submission date in the Timetable. The theses should not be bound, but placed in a document folder or held together by a bull-dog clip. Three copies will be forwarded to your examiners, and one copy will be subsequently bound and held in the BTLC thesis library.

**Honours students** must also submit an electronic copy of your thesis by 5 pm that same day to the College's Wattle website called **Science Honours Thesis Submission**.

**Masters students** should submit an electronic copy to [Patricia.Seddon@anu.edu.au](mailto:Patricia.Seddon@anu.edu.au)

You should also prepare copies of the thesis for yourself and your supervisor(s). If your work is partially supported by an outside funding organisation, you may need to make some extra copies - check with your supervisor. It is expected that you will use printers/photocopiers in the School.

### **Oral discussion of thesis**

One to two weeks after the submission of the thesis, the Chair of the examiners will arrange a discussion of your project with your examiners to assist them in their assessment. The discussion will be from 30 to 60 minutes long. Your supervisor(s) will attend but may not participate in the discussion unless invited.

During the Oral discussion your examiners will attempt to establish how well you understand the material presented in your thesis. You can expect general questions on the area of biology that underpins the work, on the specific experimental background that led to the project, on the theory behind methods used, on the design of experiments, the reliability of data, the interpretation of the data, and on the implications of the work. The guideline questions given to examiners for the discussion are (see Appendix 4):

- *How well does the student understand the principles of the work carried out?*
- *How good is the student's detailed understanding of the procedures used, the material presented and the background to the topic?*
- *How much did the student rely on the supervisor or other laboratory colleagues for guidance and assistance during the course of the study?*
- *What parts of the study were the independent work of the student, in developing ideas or carrying out techniques?*
- *Has the student modified or developed any methods to enable experiments to be done?*
- *Can the student effectively discuss new ideas that are broadly related to the field of interest but only marginally related to the topic of the research?*

See also the Criteria for Assessment of the Thesis (Appendix 4) .

After the discussion, the examiners will talk separately with you and your supervisor(s).

- *Talk with the student:* this is an opportunity for you to inform your examiners of any aspect of the year that may have negatively influenced your performance.
- *Talk with the supervisor:* during this time your supervisor(s) will give an assessment of your performance through the year (in terms of research skills, originality and work ethic), including mention of any problems, either project-related or personal, that might have affected your performance during the year. See the guideline questions given in Appendix 4.

The examiners will then write a one-page report on your performance which, together with an agreed mark, will be presented to the Final Examiners' meeting, at which the overall grades will be decided.

## IV. Roles and Responsibilities

### A Students

Your research year is a full time job. We recognise that some students need to find outside work to support themselves. However, we **strongly** urge you to keep this outside work to an absolute minimum, especially in the six weeks leading up to thesis submission. Remember that this year cannot be repeated, so work hard and get the most out of it!

Your research year is challenging and also rewarding, and while your supervisors and examiners will be there to support and assist you, the final responsibility and credit for the year rests with you. Your formal responsibilities have been spelt out in detail above (attend compulsory workshops, meetings with examiners and departmental seminars; complete all assessable and CRS items; present two seminars). In addition, as an ANU student, you must comply with all ANU student policies. An important document is the Code of Practice for Teaching and Learning available at:

[http://policies.anu.edu.au/policies/code\\_of\\_practice\\_for\\_teaching\\_and\\_learning/policy](http://policies.anu.edu.au/policies/code_of_practice_for_teaching_and_learning/policy).

**It is your responsibility to maintain good communication with your supervisor(s) at all times.**

Should you encounter any problems with your project, let your supervisor know at once. If you feel that communication has broken down between you and your supervisor, and you are not able to effectively resolve concerns with your supervisor directly, please contact any of your examiners, your local member of the Committee, or the Convener immediately. The sooner we address any problems, the sooner they can be overcome.

Your supervisor will be your principal mentor and academic adviser, although you are encouraged to consult others both inside and outside your group. Ideally, the relationship between supervisor and student is one of mutual respect and trust, and is friendly and constructive. You should have frequent and regular contact with your supervisor, although supervisors vary in the amount of time they have available, and students also vary in their needs. In particular, your supervisor will:

- play a critical role in the development and implementation of your research project together with providing you with the technical skills needed;
- comment critically on all written work submitted for assessment during the year, including the Grant Proposal and the Thesis; and
- assist you to prepare for both seminars and provide feedback on your performance.

Please bear in mind that supervisors have many other duties and may not be able to respond immediately to a request from you, especially reading drafts of your Grant Proposal and Thesis. Give your supervisor reasonable time to respond, and also try and develop a level of self-reliance so that you gradually increase your independence from your supervisor. In other words, try to develop ownership of the project.

## **B Supervisors**

The primary responsibility of supervisors is to oversee the students' work, to offer advice in the planning and execution of the various aspects of the course, and to offer help in the solution of problems. Together with the student, the supervisor should design a project that is interesting and novel, and that can be done in the timeframe of the year (see section III-A: *Overview of your research year*, p. 3).

Supervisors should advise students on the aims, presentation and scope of her/his written and oral work, although the final responsibility for all items submitted for assessment rests with the student.

Supervisors should maintain regular contact with their student(s), and arrange meeting times that are mutually convenient. Supervisors vary in the amount of time they have available for a student and how much advice and material aid they give; similarly students vary in their needs.

Supervisors must ensure that their students have completed the relevant OH&S courses. The supervisor is liable to pay a \$100 fine for each course that the student does not pass. They may be required to stop the student from conducting laboratory work until they have passed all required courses.

Supervisors are required to examine one to three projects (either in the same year or future years) if requested to do so by the Committee.

### **B1 Guidelines for input from the supervisor to course components**

#### **• Grant proposal**

The supervisor will expect to discuss the Grant Proposal with the student and to see only TWO DRAFTS of the proposal, which they can write comments on. Written comments will focus on **general suggestions** on writing style, organisation and content, i.e. no detailed corrections. It is advantageous for the student that the drafts their supervisor(s) read are close to a final draft. Students are encouraged to discuss content frequently with their supervisor(s). Students may also seek information or feedback from anyone else outside their laboratory group.

If students have more than one supervisor, both supervisors may read and provide general feedback on only TWO DRAFTS of the Grant Proposal; however, **the two supervisors should read and comment upon identical drafts; students may not submit their second draft to one supervisor and then a third to the other.**

- **Seminars**

The supervisor will give feedback on one or more practice runs of seminars.

- **Mid-term Progress Report**

The supervisor will read the report and discuss it with the student prior to sending it to the examiners for discussion at the Mid-term Meeting with examiners.

- **Thesis**

The supervisor will discuss all aspects of the thesis with the student, particularly relating to arrangement and presentation of material, presentation of data, logic and rigour of the arguments used. The supervisor may give written comments on only ONE DRAFT of the thesis. Written comments will focus on **general suggestions** on writing style, organisation and content, i.e. no detailed corrections. It is advantageous for the student that the draft which they give to their supervisor(s) is close to a final draft. Students are encouraged to discuss structure and content of the thesis frequently with their supervisor(s).

If students have more than one supervisor, both supervisors may read and provide general feedback on only ONE DRAFT of your thesis (excluding the final Discussion chapter – see below); however, **the two supervisors should read and comment upon identical drafts; students may not submit one draft to one supervisor and then a second to the other.**

**The Final Discussion chapter will not be viewed by the supervisor(s).** However students may show a 1-2 page outline of the chapter to the supervisor(s) for their written comments. This may be in dot point format or topic sentences for each paragraph which define the structure and organisation of the discussion. The goal is that this final chapter is the student's own description of what they have achieved, how the results fit into the published literature and future directions for the research. Students are encouraged to ask people not associated with their project to read this Final Discussion for clarity and fluency.

Failure to follow this “arm’s length” policy risks being exposed during the Oral Discussion of the thesis and may be penalised (see Collusion and Cheating, Appendix 2), as the examiners will be looking to assess the independence of the student’s work in particular.

## **B2 A special note for new and external supervisors**

New supervisors are welcome both from within and outside the ANU. However, an ANU co-supervisor who is familiar with the organisation and procedures of the biology Honours/Masters program should also be appointed, at least for the first one or two students that a new supervisor takes on. The new supervisor may suggest an appropriate co-supervisor or the Convener can assist you.

Guidelines for supervision with the student and ANU co-supervisor must be agreed before the project begins. You will need to decide whether the student will be based in your laboratory, or in the co-supervisor’s laboratory at ANU. Everyone will need to agree on who has responsibility for day-to-day pastoral care of the student. Projects are often of a scope and quality that can result in publishable work. Please discuss issues of authorship up front with the student and co-supervisors before the project commences.

## C Examiners

Examiners play an important role throughout the student's year. Examiners are selected by the Course Committee early in the year so they can not only serve as assessors but also give feedback on project directions at the Initial and Mid-term Meetings. Each student has a panel of three examiners, one of whom will be appointed Chair. Two of the examiners will, as far as is possible, reflect the research focus of the project, but one examiner will generally have only peripheral expertise in the area (but nevertheless will be sufficiently familiar with the language). The student is expected to write a thesis that can be assessed by all three examiners. The presence of a non-expert examiner on the examiners' panel ensures that the student is writing to an educated, but not too narrow, audience.

The student and supervisor(s) will meet with examiners three times during the year; at an Initial Meeting after assessment of the Grant Proposal, at a Mid-term Progress Meeting and at the final Oral Discussion of the thesis. **It is expected that at least two examiners and one supervisor attend these three meetings**; the others should give their comments by email or Skype.

Although seminars are not formally assessed, **it is expected that as many of the examiners as possible will attend both seminars.**

### C1 Formal requirements of examiners

- To **attend** both the Initial and Final Seminars of the student(s) they are examining; if this is not possible, the Chair of the examiners for that student must be informed.
- To **read** and provide comments and a mark on the student's Grant Proposal relative to the school's assessment criteria (Appendix 3).
- To **attend** an Initial Meeting with the student and supervisor(s) early in the year (see below).
- To **attend** a Mid-term Progress Meeting to discuss the project with the student and supervisors (see below).
- To **assess** the thesis relative to the school's assessment criteria (Appendix 4); to arrive at a final consensus mark after the oral examination of the student; to write or contribute to an Examiners' Report justifying the final mark for the thesis/oral.

#### *Student Seminars*

It is essential that examiners attend these seminars if possible, as they give background detail to the project and describe experimental design and analysis of results.

#### *Grant Proposal*

When marking the grant proposal, select a mark based on the grade criteria (Appendix 3). First pick a grade [third class, second class (low or high), or first class (low or high)] and then suggest a mark. The three examiners will reach a consensus mark at a meeting to discuss the Grant Proposal prior to the Initial Meeting with the student. The Chair will prepare a one page report which will be given to the student as feedback on their proposal (Appendix 3).

*When all student Grant Proposal marks have been finalised, the Convener will inform students and supervisors of **the grade obtained, but not the actual mark.***

#### *Initial Meeting of students, examiners and supervisors*

Examiners meet with the student and the supervisor(s), after the initial Seminar and the submission of the Grant Proposal to discuss the project plans and design. The supervisor, in consultation with the Chair of the examiners' panel, will organise this meeting; it is often held immediately after the meeting of examiners to discuss the Grant Proposal mark. The objective of the meeting is to get all those involved in the project together to discuss the

project, offer suggestions and resolve any concerns about the proposal. It is acceptable for supervisors to answer questions about project viability and direction. If the examiners have substantial concerns about the project they may have further discussions with the supervisor.

#### *Mid-term Progress Meeting*

Examiners and students meet, together with the supervisor(s), in the middle of the year to discuss the progress of the research project. The supervisor will organise this meeting. This meeting will occur shortly after the examiners receive the student's written Mid-term Progress Report. The meeting is not an oral examination; the objective of the meeting is to offer suggestions and resolve any concerns about the progress of the project. It is an informal meeting and must not include a formal presentation by Powerpoint.

#### *Meeting of examiners to discuss the thesis*

This meeting is held after all examiners have read and considered the thesis but before the oral discussion. It is often held immediately prior to the oral discussion. The goal is to understand each other's thoughts and concerns about the thesis and to decide on key questions for the oral discussion aimed at resolving those concerns.

#### *Oral discussion of the thesis with the student*

The supervisor, after consultation with the Chair of the examiners panel, will arrange a discussion of the thesis with the student, at which the supervisor is also present. Prior to this meeting, examiners should discuss their views on a mark for the thesis. After the oral discussion, the examiners talk with the student alone to discuss any issues that may have negatively affected progress, and then with the supervisor alone to determine the supervisor's views on research skills, originality, work ethic of the student and any other issues.

#### *The consensus mark and its reporting to the supervisor and BTLC*

Directly following these discussions, the examiners will agree on a consensus mark (see assessment guidelines, Appendix 4) and then immediately invite the supervisor to briefly rejoin them so they can inform the supervisor of the mark and clarify the reasons for it; the purpose here is **not** to re-negotiate the mark with the supervisor. The examiners may not be able to decide a consensus mark directly after the oral, but as soon as they have done so they should meet with the supervisor to explain it. Informing and explaining the consensus mark to supervisors should not be done by email or informally via individual examiners. Examiners then give a short report explaining the mark for the Thesis/Oral to the Biology Teaching and Learning Centre before the Final Examiners' meeting.

#### *Final examiners meeting*

At the end of the year all students' results will be considered at a meeting of all examiners and supervisors, after which the final rankings and grades will be determined. Supervisors may tell their student the final grade recommended **but not the actual mark**. The final marks are recommended to the College and then to the university. The Dean has the right to modify marks to ensure equity across the College. Students are then informed by the university of their result in the usual way.

## **C2 The role of the Chair of Examiners**

The Chair of the examiners panel has the responsibility for calling the examiners together to reach a consensus mark for the Grant Proposal. The Chair must ensure that the proposal mark reached is based upon the assessment criteria (Appendix 3) and agreed upon by the examiners before the Initial Meeting with the student and supervisors. The Chair is responsible for completing and submitting the assessment form (Parts A, B and C, Appendix 3) for the Grant Proposal with the Biology Teaching & Learning Office. Parts A and B will be

returned to the student as important feedback, so please frame the report in a positive light.

At the start of the Initial Meeting the chair should remind all present of the purpose of the meeting:

- i. To get all those involved in the project together to discuss the project, offer suggestions and resolve concerns about the proposal.
- ii. To update the examiners on progress with the project since the proposal was submitted
- iii. The student should endeavor to answer questions raised by the examiners independently, but should feel free to call on the supervisor(s) as needed.

The supervisor, after consultation with the Chair of the examiners panel, will call a meeting at the end of the year to assess the thesis. The examiners should discuss the thesis and arrive at an estimated mark before the Oral. The Chair should co-ordinate the writing of the Examiners' Report. The report should then be returned to the Biology Teaching & Learning Centre. This process should be completed approximately two weeks after receiving the thesis.

### **C3 A special note for new and external examiners**

You have been asked to examine a thesis because you have expertise in the area or can provide the viewpoint of an educated "non-expert"; thank you for agreeing to contribute. The student, supervisor(s), and other examiners will be interested in your suggestions on the overall project and experimental design at the Initial Meeting, as well as your assessment of the quality of the written work.

As described above, marks within the school are agreed upon following discussion, so until you get to know the marking standards, do not feel pressured to come to meetings with a very specific score for the work. You need only have a rough grade in mind for the work: third class, second class (low or high), or first class (low or high). In the Initial Meeting you will focus on specific critical comments about the project to discuss with the other examiners, the student and supervisors. Any problems with the project need to be resolved early for the student's sake, and this is where you will be particularly important to the process.

Hard copies of previous theses are available for you have a look at through the Biology Teaching and Learning Centre (contact [Patricia.Seddon@anu.edu.au](mailto:Patricia.Seddon@anu.edu.au)).

Please let the Convener know if you have any questions, suggestions or problems.

## **V. Student Evaluation of Learning survey**

Evaluation of your program is conducted through the usual ANU online SELT surveys. The program is a course called BIOL4001F or BIOL8701; you repeat this course for two semesters to get the 48 units required; at the end of your first semester your result is KU which means "continuing".

Please note evaluations are not released to the Convener until after marks have been finalised.

## VI. Academic Honesty and Plagiarism

Plagiarism (i.e. copying published work and passing it as your own) is a form of theft and is unacceptable. *Students committing this offence will be heavily penalised (receive no more than a pass, 50%, for the item under consideration).* Include full bibliographies with all written work. The Biology plagiarism policy is given in Appendix 2. You are also recommended to refer to the ANU Code of Practice for Student Academic Integrity: [http://policies.anu.edu.au/policies/code\\_of\\_practice\\_for\\_student\\_academic\\_integrity/policy](http://policies.anu.edu.au/policies/code_of_practice_for_student_academic_integrity/policy) and [http://policies.anu.edu.au/procedures/code\\_of\\_practice\\_for\\_student\\_academic\\_integrity/procedure](http://policies.anu.edu.au/procedures/code_of_practice_for_student_academic_integrity/procedure)

***Please be aware that taking sections from another thesis is also plagiarism and will be penalised severely.***

## VII. Life after the Course

### A Postgraduate Research Scholarships

Students intending to go on to graduate studies should bear in mind that **PhD and Masters Scholarship applications normally close at the end of October** for the following year. In addition to the Australian Postgraduate Awards (APA) scheme administered by the universities to distribute Federal Government funds, there are a variety of other scholarship sources, notably Co-operative Research Centres (CRC) and various Research Councils. Scholarships with the latter organisations may be at a higher level of funding, and may be easier to obtain - the only limitation may be that the project is more tightly specified in advance. Competition for scholarships is strong.

The ANU College of Medicine, Biology and Environment and the ANU College of Physical and Mathematical Sciences guarantee PhD Scholarships to students who attain first class grades.

Students with Second Class grades rarely obtain an APA PhD scholarship but other scholarships may be available, especially if you also have publications and relevant work experience. You could discuss application procedures and strategies with you supervisor and the Convener of the relevant Graduate Program at ANU. Ask at the Biology Teaching & Learning Centre for details.

### B Publishing your project

Many projects are of sufficient quality that they could be written up as a paper for a journal. This is to everyone's advantage. You would then have a publication to your name, which is great for the ego as well as for securing scholarships and jobs. It is usual that a paper would also have the name of your supervisor(s) as co-authors and should include the address of your supervisor(s) institutions(s) even if the work was also conducted elsewhere (remember the financial and other support that you received). There are university guidelines about who should or should not be included as an author of a paper.

Writing a paper from your thesis generally means focusing on a particular aspect of your project and presenting this very concisely. Remember the aim is to write a publishable paper, not to try to publish every detail of what you did - a squeezed version of your thesis is most unlikely to be accepted. Unless your thesis was very short it is best to start from scratch rather than trying to edit out unnecessary details from a copy of the thesis.

The normal procedure is that you and your supervisor(s) should decide exactly what is the



aim of the paper, just how little of your data is needed to present a convincing argument, and to which journal it should be sent. Then, you should produce a draft of the paper following the journal guidelines, hand it to your supervisor for comment and revision (both of you are now writing together so it should be easier than a thesis draft!): the draft will probably pass backwards and forwards between you a few times. Then, ask a few other people in the School to comment on it, and see if you need to make alterations. Then, send it off to the journal. It may take a few weeks or months for a reply, hopefully the response is positive. It is likely that you may be asked to make a few minor changes, then return it promptly.

**Write your paper as soon as you can after finishing your thesis.** The longer you leave it, the less likely it will ever be produced – a loss to you, to us and to science. An unpublished study does not really exist for the scientific community.

# APPENDIX 1

ANU College of Medicine, Biology and Environment  
ANU College of Physical & Mathematical Sciences

## College Submission Guidelines for Honours Students

College Guidelines are available at

[http://cmbe-cpms.anu.edu.au/study/more-information/current-anu-students#acton-tabs-link--tabs-0-row\\_2-3](http://cmbe-cpms.anu.edu.au/study/more-information/current-anu-students#acton-tabs-link--tabs-0-row_2-3)

Submission Guidelines include the following information, **with dates** for your Honours cohort.

- Each student must upload one electronic copy of their thesis in Portable Document Format (PDF) to the Science Honours Thesis Submission site in Wattle by the due thesis submission date. Some Honours programs may also require the submission of one or more printed copies of your thesis at this time so exact requirements must be confirmed with your Honours Convener.

**All theses are to be submitted in late October** (January commencement) **or late May** (July commencement). **See the Honours website and/or the Honours/Masters timetable for actual dates and times.**

As of January 1, 2015, any theses submitted after the due date will be **penalised by 5% of the assigned mark per working day or part thereof after the deadline.**

- Extensions will only be granted in exceptional circumstances where students can document unforeseeable circumstances that have impacted on their ability to submit on time and on the proviso that all the milestones noted below have been met.
- No applications for extensions for unforeseeable circumstances occurring prior to the due date will be accepted on the due date.

Students are required to complete a number of milestones during the Honours year and submit the Milestone Completion Form. This form is kept at the Biology Teaching and Learning Office and you will be prompted to sign it on the appropriate dates.

No application for an extension will be considered unless the completed form is submitted by this time.

Milestones to be completed:

1. Proposal seminar and/or research plan.
2. Mid-course seminar and/or progress report.
3. A month before submission both the student and supervisor to sign off on the scope of all major data collection/field work/experiments/calculations/background reading that are required for submission.
4. **Two** weeks before submission both the student and supervisor to sign off that a first draft of the thesis has been submitted to the supervisor and has been returned by the supervisor with comments.

## APPENDIX 2

### BIOLOGY POLICY ON THE SUBMISSION OF WRITTEN MATERIAL

This policy reflects the ANU Code of Practice for Student Academic Integrity:

[http://policies.anu.edu.au/policies/code\\_of\\_practice\\_for\\_student\\_academic\\_integrity/policy](http://policies.anu.edu.au/policies/code_of_practice_for_student_academic_integrity/policy)

It is the **responsibility of each individual student** to ensure:

- Work submitted for assessment is genuine and original;
- Appropriate acknowledgement and citation is given to the work of others;
- He/she does not knowingly assist other students in academically dishonest practices;
- Familiarity with the expectations for academic honesty both in general, and in the specific context of particular disciplines or courses, where these expectations are clearly outlined in faculty and course guides and handbooks.

Definitions and penalties which align with the Code are set out below.

#### **1. Plagiarism**

Plagiarism is copying, paraphrasing or summarising, without acknowledgement, any work of another person with the intention of representing this as the student's own work. This remains plagiarism whether or not it is with the knowledge or consent of that other person.

Direct copying falls under the definition of plagiarism. When students work together, they must be sure to write their assignments independently and not in collaboration with another student or group of students. The purpose of assessment is to evaluate each student's mastery of skills and knowledge. It is acceptable for students to compare and discuss results of experiments or essay concepts, but written work must reflect individual effort and all written work must be the student's own.

Plagiarism has also taken place when direct use of others' words is not indicated, for example by inverted commas or indentation, in addition to appropriate citation of the source.

To avoid plagiarism students must properly acknowledge the work of others. If students transcribe, quote, paraphrase or summarise the ideas obtained from the works of others, they must properly identify the source and author of the original work and provide full bibliographies.

**Penalty: zero marks.** Serious and in particular repeated instances of academic dishonesty constitute misconduct and need to be dealt with under the ANU Discipline Rules ([http://about.anu.edu.au/\\_\\_documents/rules/disciplinerules.pdf](http://about.anu.edu.au/__documents/rules/disciplinerules.pdf))

#### **2. Multiple Submissions (Recycling)**

Recycling is the submission of work for assessment, which has been previously presented by the same student for another assessment either at the Australian National University or elsewhere. In some cases, lecturers will specifically allow this practice. If no specific provision is made then it constitutes academic dishonesty when assessment is submitted a second or subsequent time.

**Penalty: zero marks.** Serious and in particular repeated instances of academic dishonesty constitute misconduct and need to be dealt with under the ANU Discipline Rules.

### **3. Fabrication or Falsification of Data**

Fabrication of research is the representation of data, observation or other research activity as genuine, comprehensive and/or original when it has in fact been arrived at through other means. These may be simply inventing the data, using data gathered by other researchers without acknowledgment, or willfully omitting data to obtain apparently desired results.

Any data presented as the result of lab work (whether in the form of drawings, graphs, tables or written work) must be true and representative of your findings.

**Penalty: zero marks.** Serious and in particular repeated instances of academic dishonesty constitute misconduct and need to be dealt with under the ANU Discipline Rules.

### **4. Collusion**

Collusion is the representation of original work of several persons as the work of a single student. "Collusion" needs to be distinguished from "collaboration", defined for the purposes of this document as work jointly undertaken and produced within permissible parameters. Another form of collusion involves representing the work of one good student as the work of several individual students, in for example the situation where students A, B and C pay D to do the assignment and give them copies, which they then rephrase and submit as their own.

**Penalty: zero marks.** Serious and in particular repeated instances of academic dishonesty constitute misconduct and need to be dealt with under the ANU Discipline Rules.

### **5. Cheating**

Cheating in this code means the breach of rules regarding formal examinations, or dishonest practice in informal examinations, tests or other assessments. Examples include the use of prohibited material or equipment for unfair advantage, consultation with other persons during the course of the assessment where this is prohibited.

**Penalty: zero marks.** Serious and in particular repeated instances of academic dishonesty constitute misconduct and need to be dealt with under the ANU Discipline Rules

## APPENDIX 3

### GRANT PROPOSAL DOCUMENTS

1. **Grant Proposal Form** – the form shown here is for your information. You can download a digital copy from the Wattle website.
2. **Grant Proposal Assessment:** this is filled in by your examiners; Parts A and B will be sent to you as feedback.
3. **Criteria for assessment of grant proposal**

# Grant Proposal Form

(electronic version on Biology Honours wattle web site)

## Biology Honours Program BIOL4001F & Master Research Project BIOL8701

Use double line spacing, submit ONE copy to the Biology Teaching and Learning Centre  
and email a copy to <Patricia.Seddon@anu.edu.au>.

**DO NOT DELETE** any of the instructions on this form

1. Student Name: \_\_\_\_\_

2. Student ID: \_\_\_\_\_

3. Supervisor(s):

*Supervisor(s) please sign here to indicate that you have read the proposal.*

Name \_\_\_\_\_ Signature \_\_\_\_\_ Date \_\_\_\_\_

Name \_\_\_\_\_ Signature \_\_\_\_\_ Date \_\_\_\_\_

4. Project title *Short descriptive title, not exceeding 20 words.*

5. Project summary *No more than 100 words; intended for general audience.*

6. Specific aims *Use numbered points; no more than 10 lines.*

**7. Budget: equipment, expendables and travel** *This section is only indicative of what special resources the project involves. Only include materials that must be purchased or made specifically for your project; don't include items already available. Include all travel costs. Do not include salaries.*

Add extra rows as required

<b>Item</b> (eg travel, equipment item, chemicals)	<b>Approximate cost</b>
<b>Total cost</b>	

**8. Introduction, aims, significance, research plan, timetable & references**

*Section 8 should be no more than ten double-spaced pages in 12 point Times. Figure and table captions should be single-spaced in 12 point Times. The 10-page limit includes all text, figures and tables but excludes the reference list. See the Honours handbook & webpage for advice on completing this section. DO NOT ALTER PAGE MARGINS.*



**FOR EXAMINERS**  
**Grant Proposal Assessment and**  
**Report on Initial Meeting of examiners and student**

Name of Student:

Student ID:

Project Title:

---

**Grant Proposal**

The Assessment guideline questions are in Part A of this form and the Grade Descriptors are on page 5. This assessment item is framed as a grant-writing exercise but differs a lot from the way you would assess an ARC or NHMRC grant.

When marking the Grant Proposal, select a mark based on the Grade Descriptors. Each student's proposal is marked by three examiners; not all examiners will be experts in the field of the project. The Chair of the panel will arrange a meeting of examiners to discuss the proposal and reach a consensus mark. At this meeting, decide which aspects of the project need to be discussed at the Initial Meeting with the student. Settle the proposal mark before the Initial Meeting. The mark is decided solely on the written proposal, not the meeting with the student. The supervisor may arrange with the Chair of the panel to have the Initial Meeting with the student immediately after the examiners meeting to discuss the proposal.

**Initial Meeting with Examiners**

Examiners and students meet, together with the supervisor, to discuss plans and progress. The supervisor will arrange this meeting. The meeting is not an oral examination and *should be independent of the mark of the proposal*. The objective of the meeting is to get all those involved in the project together to discuss the project, offer suggestions and resolve concerns about the proposal.

Any concerns of the examiners about the project or experimental approach should be discussed to reach a reasonable outcome. The goal is to ensure that the project will enable the student to achieve the Learning Outcomes of the course (attached).

At the start of the meeting the Chair should remind all present of the purpose of the meeting

- i. To get all those involved in the project together to discuss the project, offer suggestions and discuss concerns about the proposal.
- ii. To update the examiners on progress with the project since the Grant Proposal was submitted.

Note: The student should endeavor to answer questions raised by the examiners independently, but should feel free to call on the supervisor(s) as needed.

The Chair of the examiners enters any comments in Part B of this form.

## **Part A: Grant Proposal Assessment**

1. What were the positive features of the proposal?
2. Have the aims/hypotheses of the proposed research been clearly presented?
3. Has the basic/applied significance of the proposed research been described?
4. Has sufficient and appropriate background information been presented?
5. Have the experimental design and methods been adequately described and justified?
6. Is the proposal well organised, written in a clear and concise manner, and correctly formatted?

*Examiners: Please agree on a mark for the proposal before the meeting with the student and supervisor(s). Enter mark on Page 4.*

## **Part B: Report of First Meeting of Examiners with the Student**

The three examiners will have read and discussed the Grant Proposal, and so have a reasonable idea of the project before the meeting.

The discussion between the examiners, supervisor and student addresses the following:

- that the experiments proposed are appropriate for the project;
- if statistical techniques are required, that they are appropriate;
- that the project is achievable in the year, at least in part, such that the student's ability to interpret and analyse results can be assessed;
- whether any potential problems or obstacles to performance of the project can be identified and managed.

### **Comments**

**For administrative use only: Students will be given preceding pages only.**

### **Part C: Signatures of examiners**

**Examiners** – by signing here you indicate that

1) you have read both the Roles and Responsibilities of Examiners and the assessment standards and

2) you have reached a consensus mark on the proposal and agree with the comments in Parts A and B above.

Marks:

Consensus mark:

<b>Chair of Examiners</b>		
Name	Signature:	Date
<b>Examiner</b>		
Name	Signature	Date
<b>Examiner</b>		
Name	Signature	Date

## CRITERIA FOR ASSESSMENT OF GRANT PROPOSAL

Grades will be based on *the written proposal*.

**>90% (Honours I):** Should fulfil **most** of the following criteria:

- have an excellent and extensive knowledge and understanding of the relevant background literature and have integrated different sources of information;
- have made a critical analysis of the background literature;
- have demonstrated an ability to apply relevant knowledge to the problem under investigation, as evidenced by the experimental design and its rationale;
- have clearly explained the development of the hypothesis or aims of the project and its significance;
- have shown an exceptional appreciation of the limitations of the experimental design, techniques or methods of analysis (including statistics) to be used;
- have demonstrated an excellent understanding of what is feasible given the time, resources and approaches available;
- \*have used a clear, fluent writing style, with good syntax and exceptionally few spelling errors.

Overall, the student should have shown mastery of the topic, including outstanding understanding of the existing literature and a deep understanding of the experimental strategy and methods of analysis planned. Students falling in this category would be in the top 1-5% of students.

**80-89% (Honours I):** Should fulfil **most** of the following criteria:

- have excellent knowledge and understanding of the relevant background literature and have integrated different sources of information;
- have made a critical analysis of the background literature;
- have demonstrated an ability to apply relevant knowledge to the problem under investigation, as evidenced by the experimental design and rationale;
- have explained the development of the hypothesis or aims of the project and its significance;
- have shown a significant appreciation of the limitations of the experimental design, techniques or methods of analysis (including statistics) to be used;
- have demonstrated a good understanding of what is feasible given the time, resources and approaches available;
- \*have used a clear, fluent writing style, with good syntax and few spelling errors.

Overall, the student should have shown in-depth knowledge of the topic, including appropriate understanding of the existing literature and a good understanding of the experimental strategy and methods of analysis planned. Students falling in this category are excellent students and their work is very high quality but it falls just short of outstanding.

**70-79% (Honours IIA):** Should fulfil **most** of the following criteria:

- have a good grasp of the relevant background literature but some limitations in their understanding of it;
- have summarised rather than critically analysed the background literature;
- have demonstrated some ability to apply relevant knowledge to the problem under investigation as evidenced by the experimental design; and its rationale;
- have explained the development of the hypothesis or aims of the project with some appreciation of its significance;
- have shown some appreciation of the limitations of the experimental design, techniques or methods of analysis (including statistics) to be used;

- have demonstrated a limited understanding of what is feasible given the time, resources and approaches available;
- \*have used a clear, fluent writing style, with some grammatical and/or spelling errors.

Overall, the student should have shown command of the topic and of the experimental strategy and methods of analysis planned. Their work fails to reach Honours I standard because of a less thoughtful and less rigorous presentation and a more limited understanding.

**60-69% (Honours IIB):** Should fulfil *most* of the following criteria:

- have knowledge of the relevant background literature and have only summarised it;
- have demonstrated limited ability to apply relevant knowledge to the problem under investigation as evidenced by inadequate or incomplete experimental design;
- have provided minimal explanation of the development of the hypothesis or aims or its significance;
- have shown minimal appreciation of the limitations of the experimental design, techniques or methods of analysis (including statistics) to be used;
- have demonstrated a poor understanding of what is feasible given the time, resources and approaches available;
- \*have used a satisfactory writing style, but with grammatical and/or spelling errors.

Overall, the student should have addressed the topic satisfactorily but their knowledge and understanding is limited and the quality of the presentation leaves much room for improvement.

**50-59% (Honours III):** Should fulfil *most* of the following criteria:

- have summarised the relevant background literature but with significant omissions or errors in interpretation;
- have not applied relevant knowledge to the problem under investigation as evidenced by inadequate and incomplete experimental design;
- have provided little or no explanation of the development of the hypothesis or aims or its significance;
- have not considered limitations of the experimental design, techniques or methods of analysis (including statistics) to be used;
- have demonstrated a poor understanding or does not consider what is feasible given the time, resources and approaches available;
- \*proposal is readable but poorly organised and spoiled by grammatical and spelling errors.

Overall, the student should have presented a proposal which is barely satisfactory.

**\* For students from non-English speaking backgrounds the level of error should be such that it does not interfere with understanding of the content. Those students may wish to add “(non-native English speaker)” after their name on the Title Page of their Grant Proposal.**

## **APPENDIX 4**

### **THESIS ASSESSMENT DOCUMENTS**

- 1. Guide to Examining Thesis**
- 2. Criteria for Assessment of Thesis**
- 3. Thesis/Oral Discussion Marking Guide**

# GUIDE TO EXAMINING THESIS (INFORMATION FOR EXAMINERS AND STUDENTS)

## ASSESSMENT OF THE THESIS/ORAL DISCUSSION

- The **Introduction** should give a clear picture of the background information available when the work began. It should make clear to the general reader what was attempted and why.
- The **Methods** should be a description of what was done, presented in the briefest possible form that would enable its precise repetition. Special emphasis should be placed on establishing specificity, reproducibility, precision and sources.
- The **Results** should be a full presentation of the key outcomes of the project and should include adequate and consistent documentation. Tables and figures should be fully annotated and should be comprehensible without reference to the text.
- The **Discussion** should draw out the implications of the student's findings in relation to the current literature on the topic. *Note:- the Final Discussion chapter is the student's own written work - drafts have not been seen by the supervisor or other advisers. The supervisor is encouraged to discuss the structure of this chapter, and the details that can be included, with the student and may comment on a 1-2 page outline to achieve this.*
- Throughout the thesis, expression, presentation, consistency and general fluency should be taken into account.

**Examiners should give more weight to the Results and Final Discussion than to the other chapters.**

## ORAL DISCUSSIONS WITH THE STUDENT AND SUPERVISOR

The main discussion will normally take at least 30 minutes and should not extend beyond 60 minutes. Due to the shortened time it is essential that examiners agree on the questions to ask the student **before** the oral discussion. If any of the guide questions below can be determined from the thesis, they do not need to be in the oral discussion.

The supervisor(s) will be present at this discussion but may not contribute unless they are invited to do so by the examiners or they feel the discussion is becoming unfair to the student.

### **Guidelines for the discussion with the student in the presence of the supervisor(s):**

- How well does the student understand the principles of the work carried out?
- How good is the student's detailed understanding of the procedures used, the material presented and the background to the topic?
- How much did the student rely on the supervisor or other laboratory colleagues for guidance and assistance during the course of the study?
- What parts of the study were the independent work of the student, in developing ideas or carrying out techniques?
- Has the student modified or developed any methods to enable experiments to be done?



- Can the student effectively discuss new ideas that are broadly related to the field of interest but only marginally related to the topic of the research?

*IMPORTANT* The oral discussion is not given a fixed proportion of the thesis mark. It should be used as an aid in assessing the thesis and an overall mark given to "thesis plus discussion".

After the discussion with the student in the presence of the supervisor(s), the examiners will meet with both student and supervisor(s) separately.

**Guidelines for the discussion with the student alone:**

- Were there any issues that may have negatively affected progress?

**Guidelines for the discussion with the supervisor(s) alone:**

*Research skills*

- To what extent did the student work independently?
- What trouble-shooting skills did the student demonstrate?
- How active was the student in using or seeking relevant literature?

*Originality*

- What initiative and experimental design skills did the student demonstrate?
- Did they develop new ideas and methods?

*Work ethic*

- How well did the student manage their time?
- How motivated were they?

*Other issues*

- Were there any issues, either project-related or personal, that may have negatively affected progress?

**FINAL MARK AND REPORT**

Directly following these discussions, the examiners will agree on a consensus mark out of 100 for the student, based on the assessment criteria below. This mark should take into account the written thesis, the oral discussion and the final comments of the student and supervisor(s). A marking guide based on the assessment criteria is attached to assist decision-making.

Once a mark has been agreed, the examiners should immediately invite the supervisor to briefly rejoin them so they can inform the supervisor of the mark and clarify the reasons for it; the purpose here is not to re-negotiate the mark with the supervisor. Sometimes the examiners may not be able to decide a consensus mark directly after the oral discussions, but as soon as they have done so they should meet with the supervisor to explain it; informing and explaining the consensus mark to supervisors should not be done by email or informally via individual examiners.

The Chair of Examiners for each student should give their mark, together with a completed copy of the Thesis Marking Guide and a short report (about 1 page) justifying the mark in terms of the Criteria set out below.

In the report, please include specific comments on:

- introduction, hypotheses and aims,
- methods and explanations of methodology,
- data presentation and analysis,
- organisation of material,
- presentation (prose, succinctness, logic, correct use of Figures and Tables)
- correct citation and use of references and
- academic merit of the final discussion (eg. synthesis, critical appraisal of the results, integration with previous studies, and scholarship).

Please note in the report whether there were additional comments arising from the Oral Discussion, the chat with the student alone, or the chat with the supervisor(s) alone.

The last page of the report should be in a form that can subsequently be shown to the student, and examiners should be prepared to speak to their report at the final examiners' meeting. Any confidential comments should be confined to the page marked CONFIDENTIAL which will not be shown to the student. *Examiners should also inform the supervisor promptly (well before the examiners meeting) of the mark they have arrived at.*

For students from non-English speaking backgrounds the level of error should be such that it does not interfere with understanding of the content.

## CRITERIA FOR ASSESSMENT OF THESIS

Grades will be based on *performance* during the year, **not on potential**.

**>90% (Honours I):** Should fulfil **most** of the following criteria:

- have an excellent and extensive knowledge and understanding of the relevant background literature and have integrated different sources of information;
- have made a critical analysis of the background literature;
- have consistently demonstrated an ability to apply relevant knowledge to the problem under investigation, as evidenced by experimental design and interpretation and discussion of results;
- have presented results clearly, succinctly and in an appropriate format;
- \*have used a clear, fluent writing style, with good syntax and exceptionally few spelling errors;
- have used the correct statistical analysis and have a thorough understanding of why that particular analysis was appropriate;
- have shown an exceptional appreciation of the limitations of the experimental design, the techniques used, and the results obtained;
- have used their results to generate hypotheses;
- have outlined future experiments which are feasible and which range from the obvious to the imaginative to test these hypotheses and to extend the study;

Overall, the student should have shown mastery of the topic, including outstanding integration of their results with the existing literature and a deep understanding of the techniques used for the research. Students falling in this category would be in the top 1-5% of Honours students.

**80-89% (Honours I):** Should fulfil **most** of the following criteria:

- have excellent knowledge and understanding of the relevant background literature and have integrated different sources of information;
- have made a critical analysis of the background literature;
- have consistently demonstrated an ability to apply relevant knowledge to the problem under investigation, as evidenced by experimental design and interpretation and discussion of results;
- have presented results clearly, succinctly and in an appropriate format;
- \*have used a clear, fluent writing style, with good syntax and few spelling errors;
- have used the correct statistical analysis but have a limited understanding of why that particular analysis was appropriate;
- have shown a significant appreciation of the limitations of the experimental design or techniques used;
- have used their results to generate hypotheses;
- have outlined future experiments to test these hypotheses and to extend the study;

Overall, the student should have shown in-depth knowledge of the topic, including appropriate integration of their results with the existing literature and a good understanding of the techniques used for the research. Students falling in this category are excellent students and their work is very high quality but it falls just short of outstanding.

**70-79% (Honours IIA):** Should fulfil **most** of the following criteria:

- have a good grasp of the relevant background literature but some limitations in their understanding of it;
- have summarised rather than critically analysed the background literature;
- have demonstrated some ability to apply relevant knowledge to the problem under investigation as evidenced by interpretation and discussion of results;

- have presented results clearly and in the appropriate format but a few errors may be apparent;
- \*have used a clear, fluent writing style, with some grammatical and/or spelling errors.
- have used correct statistical analysis, with possibly a poor understanding of why it is appropriate;
- have shown an appreciation of the limitations of the experimental design or techniques used;
- have outlined future experiments which are obvious;

Overall, the student should have shown command of the topic but their work fails to reach Honours I standard because of a less thoughtful and less rigorous presentation and a more limited understanding.

**60-69% (Honours IIB):** Should fulfil *most* of the following criteria:

- have knowledge of the relevant background literature and have only summarised it;
- have demonstrated limited ability to apply that knowledge to the problem under investigation as evidenced by failure to interpret and discuss results adequately;
- have presented data without adequate care or used an inappropriate format;
- \*have used a satisfactory writing style, but with grammatical and/or spelling errors.
- have used statistical analysis which is inappropriate or not understood;
- have shown minimal appreciation of the limitations of the experimental design or techniques used;
- have outlined future experiments but some may be inappropriate or not feasible;

Overall, the student should have addressed the topic satisfactorily but their knowledge and understanding is limited and the quality of the presentation leaves much room for improvement.

**50-59% (Honours III):** Should fulfil *most* of the following criteria:

- have summarised the relevant background literature but with significant omissions or errors in interpretation;
- have not applied relevant knowledge to the problem under investigation as evidenced by inadequate interpretation of results and failure to reference the relevant literature in the discussion of the results;
- have not fully presented their results or presented them sloppily and incorrectly;
- \*thesis is readable but poorly organised and spoiled by grammatical and spelling errors.
- have not undertaken statistical analysis where it would have been appropriate to do so;
- have shown minimal appreciation of the limitations of the experimental design or techniques used;
- have outlined future experiments which are inappropriate or not feasible;

Overall, the student should have presented a thesis which is barely satisfactory.

***\* For students from non-English speaking backgrounds, the level of error should be such that it does not interfere with understanding of the content. Those students may wish to add “(non-native English speaker)” below their name on the Title Page of their thesis. They may also inform the examiners of this during their oral discussion.***

## BIOLOGY PROGRAM *Thesis/Oral Discussion Marking Guide*

This table is a guide to reaching a mark. Please include about one page of comments to justify your overall mark; **give more weight to items marked \***

Student:.....

----- STANDARD ACHIEVED -----

		Fail <50	H3 50-59	H2B 60-69	H2A 70-79	H1 80-89	H1 high >90%	
<b>BACKGROUND LITERATURE</b>								
<i>Knowledge</i>	Superficial summary							Excellent, extensive, well-integrated
<i>Understanding</i>	Significant omissions or errors in understanding							Clear understanding of all material
<i>Critical analysis</i>	No analysis							Critically analysed
<b>APPLICATION OF RELEVANT KNOWLEDGE TO THE PROBLEM</b>								
<i>Overall assessment</i>	Poor							Clear, consistent and effective application
<i>Experimental design &amp; techniques</i>	Little understanding of techniques used							Clear understanding of all techniques used
<i>*Interpretation of results</i>	Inadequate, uncritical							Excellent, critical, appropriate
<i>*Discussion of results</i>	Incomplete, uncritical, lacking logic, unimaginative							Thorough, critical, logical, imaginative
<b>PRESENTATION OF RESULTS &amp; WRITING STYLE</b>								
<i>Overall assessment</i>	Inappropriate, sloppy, incomplete, inaccurate							Clear, correct, succinct, in appropriate format
<i>Syntax, Spelling, Grammar</i>	Difficult to read, lacking fluency							Easy to read, fluent, clear and unambiguous
<i>Layout</i>	Untidy, badly organised							Visually attractive, well-organised, legible
<i>Figures and Tables</i>	Untidy, poorly labelled							Well-structured, labeled and integrated with text
<i>Citations</i>	Some missing, inconsistent format							Accurately referenced
<i>Bibliography</i>	Some missing, inconsistent format							Wide range of sources, accurately referenced
<b>STATISTICAL ANALYSIS &amp; APPRECIATION OF LIMITATIONS</b>								
<i>Statistical analysis</i>	Not performed							Correct and appropriate analysis, clearly understood
<i>Limitations of experimental design</i>	Little or no appreciation							Exceptional appreciation
<i>Limitations of results obtained</i>	Little or no appreciation							Exceptional appreciation
<b>HYPOTHESES &amp; FUTURE EXPERIMENTS</b>								
<i>Hypotheses</i>	No hypotheses generated							Hypotheses generated
<i>Future experiments</i>	None outlined							Feasible, imaginative, linked to hypotheses

**AGREED MARK:**

**%**

**Signed:**

# APPENDIX 5

## General information for Biology students

### 1. Orientation:

Biology students may be based in one of the following buildings:

Banks Building (#44), Gould Building (#116), Robertson Building (#46), Linnaeus Building (#134), JCSMR (#131) or at CSIRO or The Canberra Hospital. You will be given an induction into the building you are based in on the first day of the year by the Senior Technical Officer (STO) of that building. If you commence after this date you must report to the STO of the building and complete the induction process. Mail facilities, photocopiers and printers are located in each building.

### 2. Security and Emergency

(ANU Security: phone 52249): Most of the buildings have defined opening hours Monday to Friday. Outside the official opening hours, the buildings may be entered using your Student ID card; access will be arranged by the STOs. Never let anyone that you do not know to be a member of the School into the buildings after hours. If in doubt, dial Security 52249. If you wish to be escorted to your car at night, ring Security.

Thefts occur in unsecured areas of buildings from time to time. Thieves mostly target money (wallets and purses), laptops and valuable bikes. Never leave your room unattended and unlocked when there are valuables present. The IT Helpdesk can assist in locking down your computer. Let the STO know if there are people acting suspiciously in the building or call security immediately.

You should familiarise yourself with the emergency regulations which are posted on yellow sheets at various locations in the buildings. Read these carefully, and note what you should do in an emergency.

### 3. Email, Mail

Email is the primary mode of communication in the university and we will use your ANU email address. You are expected to read these messages within three days. Email messages may contain critical information relating to power and water outages and security. You will also receive regular notices by email from the Convener or the Student Administrator in the Biology Teaching & Learning Centre.

You may post official mail in either the "Internal" (ANU; usually green) or "External" (elsewhere; usually blue) mail bags.

### 4. Desk & Laboratory Space:

Desk space will be made available for all students by your supervisor. Your supervisor will also provide research space or suggest space you can use. If you encounter any problems with space or working conditions, see your supervisor or the Convener.

### 5. Expenses:

Supervisors are allocated limited funds to support each project, and all expenditure on the project will be charged to your supervisor. All expenditure must be approved beforehand by your supervisor.

### 6. Laboratory Safety:

All students must attend the laboratory safety course. Accidents can be prevented, and their effects minimized, by alertness, care and forethought. Should you be injured in an accident, report this promptly to the STO. You should be aware of the following "rules":

- (a) The following are prohibited in laboratory areas: eating, drinking, smoking, applying makeup, bare feet or the wearing of thongs.
- (b) As part of your training you will be instructed on how to undertake a hazard audit and how to avoid and minimise those hazards. You should always wear a lab coat when in the lab and additional personal protection gear such as gloves and eye protection etc as necessary.
- (c) You cannot work alone when undertaking work with hazardous materials and this includes out of hours and weekends. Hazardous materials include: heavy objects; sectioning equipment with large cutting surfaces; corrosive or inflammable liquids; toxic gases or vapours; and very hot or very cold materials.
- (d) Discuss any questions of safety with your supervisor or the STO for your building. Students using radioactive materials in the department must attend a radiation safety course before starting the experiment.

## **7. Animal Experiments and permits for collecting:**

The ANU requires all experiments on animals to be approved by the Animal Experimentation Ethics Committee. This committee examines all proposals to ensure that it conforms with animal welfare regulations. In particular, the committee must be convinced that there is no cruelty involved in the experimental techniques, trauma is minimised, and that the number of animals involved is scientifically justifiable. BEFORE undertaking ANY experiments on animals: 1) you must attend the animal ethics seminar and 2) a proposal form must be completed by your supervisor, signed by the Head of School, and approved by the Committee. See your supervisor first. The term "experiment" is interpreted very widely and includes visual observations on animals in the laboratory and handling animals in the field. "Animal" refers to all vertebrates, cephalopods and, under some circumstances, large crustaceans. There are also strict, but different, regulations in the ACT and states governing the collection of native animals (including invertebrates) and plants. Permits must be obtained and their conditions followed add links for NSW and ACT permits are available online. Your supervisor will assist you in obtaining permits.

## **8. Research equipment:**

Most equipment you require will be supplied by your supervisor, although, after obtaining permission, it may be possible to use equipment held or maintained by other members of staff. You must ensure you have sufficient training to use this equipment and you return it clean and in good condition. If you need equipment to be made especially for your project, it may be possible to do so in the RSB Workshop. However, it is essential that you discuss your plans with your supervisor. Occasionally it may be necessary to approach another department for permission to use or borrow equipment. This must be done through your supervisor. The STO must also be notified if you want to transfer equipment into or out of the School. The workshop can both repair and manufacture equipment but be aware that fabrication requires forward planning. Priority for such work will be based on the overall school needs and not just your personal deadlines.

## **9. Supplies of glassware and consumables:**

Requests for supplies should be directed to your supervisor in the first instance. Many of the things you need may be available from your supervisor's lab. Your supervisor can initiate purchases of special items as required. The ANU has a number of impress stores and preferred supplier agreements that can supply glassware, chemicals, equipment and most items routinely used in research. See the STO for information. Limited amounts of stationery are available from the front office of each Division and your supervisor. Anticipate your requirements and regularly check stocks. One of the greatest sources of angst is running down stocks of chemicals and consumables to the point of exhausting them. Be aware that some supplies can take weeks to arrive.

## **10. Special facilities available for general use:**

(a) Cold and Constant Temperature Rooms - Discuss use with your supervisor (and with particular staff members in relation to equipment in these rooms). Do not store any material in these rooms which might give off toxic or volatile vapours – this includes dry ice and liquid nitrogen. Label everything that you place in them with your name, supervisor's name, date and phone number. Fill in the sheet on the door. Report any malfunction to your supervisor or to the STO.

(b) Wash-up Rooms – Ask your supervisor how this is managed.

(c) Autoclaves, sterilizing oven – The STO will provide training on the use of this equipment and should be contacted about any problems. In the first instance, arrange use through your supervisor. This facility should not be used for sterilising soil or pots, and whenever there is a possibility of spillage, e.g. with delicate glassware or sterilising plastic bags, materials should be placed within a metal container for autoclaving. If spillages do occur, seek advice immediately on how to clean up.

(d) Computers – If needed, a computer will be provided for you to use. Discuss this with your supervisor. Some students prefer to use their own laptops, others work on School computers, or computers supplied by the supervisor.

Be aware that the ANU has a strict policy on downloading and file sharing.

[http://policies.anu.edu.au/policies/acceptable\\_use\\_of\\_information\\_infrastructure/policy](http://policies.anu.edu.au/policies/acceptable_use_of_information_infrastructure/policy)

<http://information.anu.edu.au/daisy/infoservices/372.html>

We have checks in place and you will be charged for downloads when the material is not work related and for large files unless previous agreement has been established.

(e) Plant Culture Facilities - Space in glasshouses and in growth cabinets is limited and there are often

waiting lists. Arrangements should be made through your supervisor.

### **11. Photography:**

Make sure to document your project with photographs. If you have a good quality camera, use your own, otherwise there are cameras available in the school or your supervisor's lab. Photos of study organisms, sites, and you at work will be useful in your seminars and potentially in your thesis. Colour printing may be done on School photocopiers.

### **12. Photocopying:**

**(A) NOTE THE NEED TO FOLLOW THE COPYRIGHT REGULATIONS.**

**(B) COPYING OF REFERENCE MATERIAL, GRANT PROPOSAL ETC.**

Minimise the number of copies and sheets used (our machines can copy on both sides) and only print in colour when necessary.

**(C) COPYING OF THESIS –**

Four copies of the thesis must be handed in to the Biology Teaching & Learning Centre. You will also need copies for yourself and your supervisors. The School pays the cost of photocopying.

### **13. Use of School vehicles:**

Permission to drive School vehicles can be given only to students who hold a current Driving License and have completed the driving course – this can be arranged through your STO. School regulations on the use of vehicles are posted on the RSB Intranet; these regulations must be strictly adhered to. In particular note that:

**DRIVERS WITH PROVISIONAL LICENCES, DURING THEIR FIRST YEAR:**

- (i) must display P plates,
- (ii) may drive university 2WD vehicles but must be accompanied by another person that has a full licence. Both people also require an ANU driving authority,
- (iii) cannot drive university 4WD vehicles.

**DRIVERS WITH PROVISIONAL LICENCES, DURING THE SECOND AND THIRD YEARS:**

- (i) may drive university 2WD vehicles unaccompanied, provided they have an ANU driving authority,
- (ii) may drive 4WD vehicles but must be accompanied by another person that has a full licence. Both people also require an ANU driving authority and must have attended one of our 4WD familiarisation courses.

**DRIVERS WITH AN UNRESTRICTED LICENSE:**

may drive university 2WD vehicles unaccompanied provided they have an ANU driving authority. Drivers of 4WD vehicles must also have attended one of our 4WD familiarisation courses.

The School expects you to always drive with proper caution - there is no excuse for speeding or careless driving. Vehicle accidents are the major source of serious chronic injury and death amongst young and inexperienced drivers and their passengers, and pose a much greater risk than most of our laboratory or field procedures. Also, repairs to vehicles from even minor accidents cost the School a substantial part of our budget that could otherwise be used on research. Remember that students who commit driving or parking offences in School vehicles are still responsible for their actions and must pay any penalty.

Note that School vehicle use is charged by distance and you must ensure that there are adequate funds available before using a vehicle. Heavy use of vehicles must be discussed with the STO, and presented formally via a form obtainable from the STO.

Vehicle keys are locked away, and can only be obtained from the Divisional Administrator or the STO team. Vehicle booking is done by an online system accessible from the RSB intranet pages. Only people with ANU Driving Licenses are able to book vehicles. Students who misuse vehicles, or do not adhere to the regulations, may lose their privilege to drive School vehicles. Routine problems with the vehicles include not reporting small accidents, failing to return the vehicle at least half full of petrol and cleaning. People who continue to offend will have their access to vehicles removed.

If you plan to use your own vehicle for work relating to your study you must consult with the STO.



#### **14. Field work:**

Many students will be undertaking field work and it is important that this is conducted safely. You must read the University Policy on Fieldwork, available on the web. You must complete and submit the relevant online travel form(s) to cover all fieldwork episodes – even local ones - basically these are a checklist to ensure that you have evaluated any risks and take appropriate action. These forms establish routes and times so we know where you are if you do not return on time. They also provide a hazard audit.

Students whose project involves field work are required to undertake a first aid course if they do not already hold first aid qualifications. This will be paid for by the School.

#### **15. Volunteer Help for Students:**

Many students rely on the assistance of friends and family (who are not ANU staff) to help with projects and fieldwork. There are some insurance and policy issues you must be aware of. Please fill in the volunteer declaration available online for any volunteer who will be working with you.

Volunteers, and indeed students, have no workers compensation cover in the event of an injury (remember that there have been cases of permanent injury and death). There is limited insurance cover for all participants on fieldwork but this does not apply to other work.

You, and any volunteer, have the right to pursue the ANU to recover any medical costs, loss of earning potential et cetera arising from an accident while undertaking work related to your project but any claim would be by negotiation or litigation.

The ANU does retain the right to sue anyone for any act of gross negligence leading to injury of another person and or damage to ANU property. This applies to any volunteer.

Any one helping you in a volunteer capacity should be informed by you of these conditions before they commence assisting you.

You are directly responsible for any volunteer you bring into the building and must be present and provide supervision. You will be responsible to ensure that the person assisting you has the appropriate skills and training. You should not undertake any hazardous work out of hours.

Generally we will not approve fieldtrips for student if they are unaccompanied. When traveling you and any volunteers are covered under the third party compulsory vehicle insurance for any accidents while driving unless the driver is at fault. ANU policy requires that all those traveling with you must be listed on the travel proposal and this must be approved before you depart. Volunteers are not allowed to drive ANU vehicles other than in emergencies and there are conditions applying to students you should familiarise yourself with.

Children are not considered volunteers. Only under exceptional circumstances will approval be given for children to accompany you. Note that none of the School vehicles have child restraints.

**16. Telephones:** Most telephones in the School are limited to calls within the University. Selected phones allow external local and STD calls. If you want to make an external call, you may use your supervisor's phone after permission has been granted.

#### **17. Student representative:**

Students will be asked to elect a representative, which meets twice a year.

#### **18. Statistical Advice:**

You may require statistical advice on planning your project design and the subsequent analysis. Contact the ANU Statistical Consulting Unit, together with your supervisor who should attend at least the first meeting. There may be a delay of 1-2 weeks in getting appointments so plan ahead.

The consulting unit runs courses on statistics, experimental design, and analysis from time to time. See the Timetable.

#### **19. Harassment and Discrimination**

University policy is that all members of the University have the right to be safe from sexual harassment, which can be defined as: "... unwanted, unwelcome or uninvited behaviour of a sexual nature that makes a person feel humiliated, intimidated or offended. It can involve physical contact, verbal remarks or non-verbal contact of a sexual nature." Whatever your intentions, avoid any behaviour which could be interpreted as sexual harassment. Sexual harassment can be difficult to deal with as a student, particularly if you are being harassed by someone in authority. However, there are many different avenues you can pursue if you feel that you are being harassed or subjected to unwanted attention. You can raise your

concerns with a School contact officer, the Convener or the Head or Deputy Heads of Biology Teaching & Learning. There are other helpful groups in the University, including student associations, student counselors or the Committee Against Sexual Harassment (CASH). Whether you choose to discuss the problem in general terms only, or lodge a formal complaint, you should feel that you do not need to deal with the problem alone, or that you are to blame. Sexual harassment is inappropriate, unprofessional behaviour, and by contacting the appropriate people you can ensure that it does not continue or happen to anyone else. Some people do not take action because they think that "everyone knows but nothing is done about it"; in fact it is most likely that the appropriate people know nothing about it, or that they have heard only rumours on which they cannot act.

#### **20. Use of the Tea Rooms:**

You may use the Tea Room facilities in the buildings, which include a hot water supply, microwave and refrigerator. You are expected to use the dishwasher or do your own washing-up and cleaning. Laboratory coats and gloves MUST be removed before entering any Tea Room and kitchen.

#### **21. Happy Hours:**

There is a happy hour (or two) each week in many areas and you are warmly encouraged to attend.