BIOL4001

Biology Honours Program

BIOL8701

Master Research Project

Information for Students, Supervisors & Examiners

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Handbook update March 2023

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I. Welcome

The Biology Honours/Masters research year is an 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 research planning, literature searching, laboratory or field techniques, data analysis and presentation, inductive reasoning, and written and oral communication. You will also advance your knowledge and understanding of 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 limitations. 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 Honours Divisional Representatives 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

Students starting in Jan/Feb
Convener: Simon Williams
T 6125 7862
E simon.williams@anu.edu.au

Students starting in July (Mid-year)
Convener: Marcel Cardillo
T 6125 9035
E marcel.cardillo@anu.edu.au

Course Committee

There are three committee members: one from each of the *Division of Ecology & Evolution*, the *Division of Biomedical Sciences & Biochemistry*, and the *Division of Plant Sciences*. Their details are listed on the cover page of this booklet.

General enquiries

Please direct any administrative enquiries to:
Helen Wong, Student Administrator, Biology Teaching & Learning
T : 6125 9090; E rsb.studentadmin@anu.edu.au

Heads and Deputy Heads of Biology Teaching & Learning:

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

Maja Adamska (Head): T 6125 1631; E Maja.Adamska@anu.edu.au
Juliey Beckman (Deputy Head): T 6125 9091; E Juliey.Beckman@anu.edu.au

Honours/Masters Wattle website:

You can access this by logging in via https://wattle.anu.edu.au/. The site is called *BIOL4001/BIOL8701 Biology Honours, Master Research Project* or *BIOL4001/BIOL8701 Biology Midyear Honours, 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 information.

This site also includes a discussion forum.

After logging in to Wattle you will see you also have access to a website called Science Honours/Masters Thesis Submission; this site contains the College Honours Guidelines, Timeline and Submission Guidelines.

Please also see the College website for Honours Guidelines, Honours Handbook, Timetable and Submission Guidelines. To the best of our knowledge, all information in this handbook is consistent with the College information.

If any problems arise during the year that affect your ability to do Honours, it is important that they are resolved as soon as possible. First see your supervisor, and if further discussion is required contact the Course Convener or Divisional Representative

II. Timetable & Milestones

The Timetable given to you may change over the year. The most recent Timetable will be available on the Honours/Masters Wattle website. Any major changes will be emailed to you.

The ANU College of Science has defined Milestones that must be completed by all students in the ANU College of Science. Biology has a detailed list of milestones guided by those recommended by the College. Please refer to the Biology Honours/Masters timeline.

The Milestone Record will be kept on file in the Biology Teaching and Learning Office. If you need to request an extension, the Course Convenor and Director of Science Education will require that your Milestones are up to date.

III. The Course and its Assessment

The central feature of the course is a research project that you will plan and carry out under the guidance of your supervisor(s). You will present your project as both a written thesis and an oral presentation. The course includes a mix of assessed and non-assessed activities designed to support your major task of conducting and reporting on your research.

Your work will be assessed by a panel of three examiners. Typically, two examiners will be familiar with the research field and the third will be a non-expert. The non-expert examiner will be able to assess the basic logic and clarity of your presentation, rather than the technical details. All examiners will be looking for quality of presentation in your work, rather than the amount of work you have done. They will be assessing your understanding of the background, experimental strategy and broader implications of your work, rather than the importance of the results themselves.

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

A. Overview of your research year

The program covers about nine months and is based entirely on independent research.

You will spend much of the first six weeks attending introductory Workshops and OH&S courses, meeting with your supervisor to agree upon expectations and responsibilities and working with them to develop your research plan in the form of a Grant Proposal. The goal of the workshops and the expectations agreement is to provide you with 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 takes no more than 5-6 months. This ensures you have time to analyse your data and write a high-quality thesis; both are likely to take longer than you expect! Don't attempt to take on too much: instead, focus on the quality of your research, grant proposal and thesis.

You will write a Mid-term Progress Report and give two seminars. At the Initial Seminar (held around week 5) you will introduce your peers and academics to your project topic and your research plan. In the Final Seminar (held approximately 6 weeks prior to thesis submission) you will present your key research findings.

As a member of a research laboratory, you should participate in your research group's regular meetings and other activities. You should also attend seminars both within and outside RSB 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, your progress through the year is monitored by the completion of Milestones (there are six 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, and many students go on to publish their work in peer-reviewed journals.

B. Course components and how they are assessed

The table below lists, in chronological order, an assessment summary of the different course components (also indicating *Milestones 1-6*). Please refer to the separate Timetable document for actual dates and times. The two components that are formally assessed are the Grant Proposal and the Thesis & Oral Discussion. Note that the non-assessed components are still course requirements that must be satisfactorily completed (CRS).

Component	Honours	Masters
Workshops and OH&S courses	CRS[1]	CRS
Candidate and Supervisor Expectations Agreement (*Milestone #1)*	CRS	CRS
Initial Student Seminar (*Milestone #2*)	CRS	CRS
Grant Proposal (*Milestone #3*) [2]	15%	CRS
Initial Meeting with examiners	CRS	CRS
Mid-term Progress Report (*Milestone #4*)	CRS	CRS
Mid-term Meeting with examiners	CRS	CRS
Final Student Seminar	CRS	CRS
Completion of Research Work (*Milestone #5*)	CRS	CRS
Draft Thesis (*Milestone #6*)	CRS	CRS
Thesis & Oral Discussion with examiners [2]	85%	100%

[1] CRS = Course Requirement Satisfied

[2] The marks for these assessed components will be a consensus reached by all 3 examiners.

The following gives an overview of each component.

Workshops and OH&S courses: Many workshops are compulsory for all students, and some are compulsory for students doing a particular kind of research. See the Timetable for details. Students may attend any non-compulsory workshop they wish. The workshops are an important part of your research training! They are designed to familiarize you with key safety requirements and provide you with valuable research skills. OH&S courses (eg Chemical Safety, Biological Safety, Ionizing Radiation Safety, Gene Technology and Animal Handling) must be undertaken where relevant (see Timetable). Any exams must be passed at the beginning of the program. If you don't show up to a compulsory workshop, or don't pass the test, your supervisor may incur a $100 fine and you may be unable to conduct laboratory work.

Candidate and Supervisor Expectations Agreement (Milestone #1): This agreement is non-binding but serves an important role in ensuring the student (candidate) and supervisor(s) have met to discuss a variety of issues (eg the candidates career aspirations, type and level of supervision to be provided, the requirements of the research project and training needs) to help establish agreed expectations and ensure both student and supervisor(s) have a clear understanding of responsibilities.

Initial Seminar (Milestone #2): 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 in section III-D1.

Grant Proposal (Milestone #3): 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 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. The meeting is an opportunity to get to know your examiners, discuss your research plan together, and identify potential concerns, early enough in the year that you still have time to make any changes to your research plan. Your supervisor will arrange this meeting and will also be present.

Mid-term Progress Report (Milestone #4): this short (typically ~3-6 pages) document should summarise your project aims and detail your progress and be submitted as a pdf by email to the Biology Teaching & Learning Centre (see Timetable for due date). The report should be a concise summary of progress to date. There is no set format, but you might structure it around the research aims or questions given in your Grant Proposal. It provides a basis for discussion at the Mid-term Progress Meeting.

Mid-term Progress Meeting: with your examiners and supervisor(s). Few projects go exactly as planned, so this meeting is an important opportunity to let your examiners know if things are on track, get feedback or suggestions from them, and to raise any concerns you might have. The Biology Teaching & Learning Centre will forward your Progress Report to your examiners and supervisor(s); you can also take along extra results and figures to show your examiners. *You (the student) is responsible for arranging this meeting*.

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

Completion of Research Work (Milestone #5): one month before submitting your thesis, you and your supervisor(s) should agree and sign off on completion of all major data collection, field work, experiments, calculations, data analysis and background reading that are required for submission. This is to ensure that you have all the data and results that you need to focus on writing your thesis for the remainder of the year.

Draft Thesis (Milestone #6): two weeks before submitting your thesis, you will have completed a draft of the 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.

Thesis & Oral Discussion: the thesis is the formal written presentation of your research project. About two weeks after submission, you and your supervisor will meet with your examiners to have an oral discussion of the thesis; your supervisor will arrange this. The thesis is worth 85% of the final Honours mark, and 100% of the final Masters mark. The oral discussion itself is not marked but is used as an aid for the examiners in assessing the thesis. The assessment criteria used to arrive at a mark for the thesis 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, doing fieldwork or computational analyses, you may find that the hours you work are not the normal nine to five, five days a week. In research, your working schedule is often determined by the nature of the work you are doing. 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 and from your project. You might not take every weekend off, but you should take the equivalent number of days off during the year. You should also take a reasonable amount of holiday time. Taking regular breaks means you will come back to your work refreshed and will help to ensure your own well-being during the year. Ultimately, the quality of your thesis will benefit.

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.

C.2 Extensions and penalties for late submissions

An extension to a deadline may be granted if you have a medical issue that requires 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. Extension requests after completing Milestone 5 will only consider medical issues (with doctors' certificate) and compelling personal reasons incurred after the submission date.

The decision to grant extensions rests with the Course Convener in consultation with the Course Committee. Extensions beyond two weeks also require the approval of the Deputy Dean of Science Education. Support from your supervisor(s) will be considered. Submission *after* the revised deadline (ie when an extension has been granted) will be penalised (see below).

An extension will not be granted simply to complete the work originally planned. Almost all research projects run into unforeseen problems and delays, which means your plans need to be modified. Sometimes your aims will need to be modified, a particular experiment left out, or the scope of the project reduced. This is a normal part of doing research, even for experienced researchers. Remember, you will be assessed on your analytical skills, critical thinking and understanding, not on the size of the project, or the importance of your findings. There are many examples of outstanding theses that have emerged from incomplete projects, in which students have discussed the difficulties encountered.

There is an ANU-wide policy for late assessments. 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 assessed mark was 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 seminars during the year. The Initial Seminar is a brief introduction to your research topic and an outline of your proposed project. The Final Seminar is a presentation of what you have achieved during the year to date and provides a good 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.

Make sure you attend the workshop on presenting seminars – you will get valuable tips.

Initial Seminar

Remember that you'll be presenting to a general audience of staff and students, most of whom are not specialists in your area of research, so your talk should be pitched at a general level. You'll need to pay particular attention to providing some background and context for your project, explaining what kinds of questions you are asking, and why these questions are important to ask. You'll also need to provide a brief overview of the approach and methods you plan to use.

You will have 15 minutes to present your proposal, followed by 5 minutes for questions. The audience will know that you may not yet be familiar with all the methods you will be using, and your supervisor may step in to field any difficult questions.

Keep audio-visuals simple; it is the content that is important, not the use of fancy graphics. 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 text on slides to a minimum, and large enough to read easily
- Use the slides to prompt you and guide the audience
- If you speak quietly, use a microphone
- Try to present the talk without reading it - this is much more engaging
- Where possible use photographs or diagrams
- State your aims or questions clearly
- Outline your research plan and methods – no need for lots of technical detail
- QUESTIONS: anticipate them and prepare answers. If you do not know the answer to a question, it's fine to say so.
- PRACTISE with an audience, including setting up the room and equipment.

Final Seminar

The guidelines for the final seminar are similar to the initial seminar, but there will be more emphasis on the results and conclusions you have reached so far. Again, remember to pitch it to a general audience, and 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 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 main ways:

1. Proposal writing is an important skill not only in academic science but in many other sectors as well. There is a skill involved in summarizing concisely a research plan, making a convincing case that the research is important, and demonstrating that it can be successfully completed within the constraints of time and funding.

2. A good Grant Proposal requires that you have understood the theoretical background to the research, become familiar with the important literature, and planned the practical aspects of the project. Writing the proposal is usually an excellent way to clarify your own thoughts about the topic and project, and get your ideas into a logical order.

3. Much of the content of 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 the project description part of an Australian Research Council (ARC) or National Health & Medical Research (NHMRC) grant application. The research proposal (section 5) must be succinct and follow the formatting guidelines provided in the 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. However, written comments from your supervisor will be restricted to general comments on TWO DRAFTS regarding writing style, organization and content, ie no detailed corrections (see section IV-B1).

- 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 describing your particular study system or species.
- Explain the significance of your proposed research: why it is important and interesting.
- 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.
- The research plan should explain how you are going to achieve your aims, in enough detail for the examiners to judge whether the approach is suitable or

likely to work. This includes what equipment you will use, and what field observations, experiments, or data collation you will carry out. It is important to provide some justification for your choice of methods.

- Ideally, you will think in advance about the statistical tests you will use to analyze your data, because this can influence the way you design your experimental setup. However, the examiners will understand that you won't necessarily be an expert in statistical methods at this stage of the year.
- The timetable lists when each component of your research plan will be carried out. 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 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.

Submitting the Grant Proposal

E-mail a digital PDF copy of your Grant Proposal to Helen Wong (rsb.studentadmin@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 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 preparing a thesis will be held two to three months before the submission date. In addition, the ANU's Academic Skills and Learning Centre offers online resources and workshops on academic writing skills; we 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 from the BTLC, by email request to BTLC from your supervisor, but they cannot be copied.

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
- 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 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, context, and rational for the research. It should establish the hypotheses, outline current

knowledge, and state the aims. You should be able to adapt much of the content of the Grant Proposal to include in your 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.

The Methods should be presented in sufficient detail that would allow, in principle, your work to be repeated by others. Detailed accounts of published techniques should not be included, but fine details of techniques can 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. RThists should not include comparisons 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 of the thesis should be a Discussion. The Discussion should draw all observations and experiments together, summarizing the main findings, explaining 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 previous work as described in the Introduction, and where suggestions for future research should be offered. This chapter will be entirely your own work and is uniquely your statement; your supervisor will not see it. You are allowed to discuss the organisation of your thesis with your supervisor.

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 summary (see section IV-B1 below for more details).

- *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]*

- *Appendices*
  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.

  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, and examiners are not required to read them. Important results must be in the body of the thesis.

  - *Conventions:* Please follow scientific conventions 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 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.

- *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. 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. 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.
  Usually, you do not interpret the result in the figure legend; the place for this is in the text (eg The results in Figure XX show…).
- *Statistics:* 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 (eg F, t, 2 etc), the degrees of freedom and the probability value.
- *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, or a systematist if you are not yet confused.
- *Statistics and data analysis:* Skills and experience in using statistics are an important part of research. Statistical summary and evaluation of data are usually critical to interpreting results. You should give some thought to how your data will be analyzed when you are planning your research, not after your results are in. You don’t want to discover that your experimental design lacks the

power to reject your hypothesis after it's too late to make more observations. Consult with your supervisor about data analysis at the planning stage!

Remember that the purpose of statistics and data analysis is to help bring out the patterns in the data – not to impress others. Your statistical analysis doesn't need to be complex or sophisticated to be powerful and elegant. Statistical methods required can range from simple descriptive statistics to complex models – use whatever you need to answer your questions but avoid the temptation to use complex-sounding methods if you don't need them.

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.

- Submitting your thesis
  - Honours students must submit an electronic copy of their thesis by 5 pm that same day to the College's Wattle website called Science Honours Thesis Submission.
  - Masters students must also submit an electronic copy of their thesis by 5 pm that same day to the College's Wattle website called Science Masters Thesis Submission.
  - Keep an electronic copy of your thesis and provide one for your supervisor.

- Oral discussion of thesis

One to two weeks after the submission of the thesis, the Chair of the examiners (in consultation with your supervisor) 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?*

The oral discussion itself is not marked. Its aim is simply to help the examiners assess your thesis. See 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 thesis and oral discussion, including an agreed thesis mark. The thesis mark will be presented to the Final Examiners' meeting at which the overall grades will be decided.

IV. Roles and Responsibilities

A. Students

Striking a balance between the demands of your research and paid employment.

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 outside work to an absolute minimum, especially in the six weeks leading up to thesis submission.

There is variation in the time demands of research projects as well as supervisor expectations on attendance. Discussion of this issue is part of Milestone 1 where an agreement should be made on the amount of allowable outside work the student can undertake during their research year. *Requests for extensions are not granted for delays in progress stemming from commitments to outside work.* Students should notify supervisors if their outside work hours increase above those agreed upon.

Your research year is challenging and rewarding. While your supervisors and examiners will be there to support and assist you, the final responsibility and credit for the year is yours. Your formal responsibilities will have been discussed while completing Milestone 1 and 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.

The supervisor-student relationship – shaped from your Milestone 1 agreement

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

In most cases your supervisor will be your principal mentor and academic adviser, although you are encouraged to consult others both inside and outside your group. The relationship between supervisor and student should be one of mutual respect and trust and be 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 need for direct input. Typically, your supervisor will:

- play a critical role in the development and implementation of your research project together with helping you gain the technical skills needed,
- comment critically on written work submitted for assessment during the year, including the Grant Proposal and the Thesis, and
- assist you to prepare for 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 try to develop a level of self-reliance so that you gradually increase your independence from your supervisor. In other words, try to develop ownership of your project. The above aspects will have been discussed when completing Milestone 1.

Dealing with a difficult relationship in the workplace.

Should you encounter any problems with your project, let your supervisor know immediately. If you feel there are communication problems with your supervisor, and you are not able to effectively resolve concerns with your supervisor directly, please contact any of your examiners, the Convener, or any member of the RSB Honours Committee immediately. The sooner problems are addressed, the sooner they can be resolved. You can also check out these support services provided by the ANU:

https://services.anu.edu.au/education-support/supporting-students/students-in-distress
https://counselling.anu.edu.au

B. Supervisors

The primary responsibility of supervisors is to oversee the student's 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. Within the first 3 weeks of the course the supervisor(s) should organize to meet with the student and complete Milestone 1 (Appendix 3). This meeting should discuss the project design and ensure it is interesting, novel, and (most importantly) can be completed in an ~30-week research timeframe. Importantly the supervisor should clarify with the student, and agree upon, the amount of allowable outside work the student can undertake during their research year.

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 arrange alternative on-site supervision (co-supervisor or nominated academic) if absent for more than two consecutive weeks during the honours/master year.

Supervisors must ensure that their students have completed the relevant OH&S courses. They may be required to stop the student from conducting laboratory work until they have passed all required courses.

RSB lab leaders are required to examine up to three projects in any one year, if requested to do so by the Committee.

A supervisor is required to hold a PhD as a minimum qualification.

B1. Guidelines for input from the supervisor to course components

Grant proposal

The supervisor is expected 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, ie 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 a student has 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 - PLEASE READ THIS SECTION CAREFULLY

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, ie no detailed corrections. It is advantageous for the student that the draft that they give to their supervisor(s) is close to a final draft. Students are encouraged to discuss the 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 the SAME DRAFT of the thesis (excluding the final Discussion chapter – see below); 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 are encouraged to 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.

B2. A special note for new and external supervisors

New supervisors from both within and outside the ANU are welcome to be co-supervisors of RSB Honours/Masters students. However, the primary supervisor should be a member of RSB who is familiar with the organisation and procedures of the Biology Honours/Masters program. An external researcher may be the primary supervisor only with the approval of the Biology Honours Convener and Committee.

Guidelines for supervision must be agreed between the co-supervisors and students before the project begins. You will need to decide in whose laboratory the student will be based. 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 assess the student's work, but they have an equally important role in facilitating the project by providing feedback and encouragement. Examiners are selected by the Course Committee early in the year so they can 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, be familiar with the research area of the project, but one examiner will generally have only peripheral expertise in the area (but nevertheless should be sufficiently familiar with the area to be able to follow the thesis). 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, generalist 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 will attend these three meetings; the others should give their comments by email or Skype. It is important that panel meetings are a positive experience for the student, the supervisor(s) and the examiners. Where examiners have concerns about the project, they should frame their feedback in terms of constructive suggestions for improvements rather than negative comments. Where there are concerns about the feasibility or validity of the project these should be discussed with the supervisor(s) before the panel meeting.

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

- Attend both the Initial and Final Seminars of the student(s) they are examining; if this is not possible, please inform the Chair of the examiners.
- Read and provide comments and a mark on the student's Grant Proposal relative to the school's assessment criteria (Appendix 3).
- Attend an Initial Meeting with the student and supervisor(s) early in the year (see below).
- Attend a Mid-term Progress Meeting to discuss the project with the student and supervisors (see below).
- 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.

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 that 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 should discuss with the supervisor(s) before the meeting and may have further discussions after the meeting.

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 positive suggestions and resolve any concerns about the progress of the project.

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. IMPORTANT – please read the guidelines for marking theses given in Appendix 4. The oral discussion itself is not marked.

The consensus mark for the thesis and its reporting to the supervisor and BTLC
Directly following these discussions, the examiners will agree on a thesis consensus mark (see thesis assessment guidelines, Appendix 4) and the Chair will then in person 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. Examiners then prepare a short report explaining the mark for the thesis to the Biology Teaching and Learning Centre before the Final Examiners' meeting.

Honours students who submit an excellent thesis and who have an exceptional academic record will be nominated for a University Medal. If you consider the thesis you are examining is of this standard, please make this clear within your report, and provide detailed justification of why the thesis is outstanding compared to others in the discipline.

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 compiling the feedback from each examiner into a structured Grant Proposal report (Parts A, B and C, Appendix 3) and emailing this to the Biology Teaching & Learning Office. Parts A and B will be returned to the student as important feedback, so please frame your comments in a constructive and encouraging manner. Reports with vague, ambiguous feedback may be returned to the chair of examiners with requests for additional clarifying detail.

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

1. To discuss the project, offer suggestions and resolve concerns about the proposal.
2. To update the examiners on progress with the project since the proposal was submitted.
3. The student should endeavor to answer questions raised by the examiners independently, however, 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 using feedback obtained from each examiner. The report is then emailed to rsb.studentadmin@anu.edu.au. This process should be completed about 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. Therefore, you need only have a rough grade in mind when coming to meetings: third class, second class (low or high), or first class (low or high).

Note that while the Proposal is marked, the Initial Meeting is for discussion and feedback and not assessment. The discussion should focus on ways to make the project and the student's experience as productive and enjoyable as possible. Any problems with the project need to be resolved early for the student's sake, and this is where your role is particularly important.

Hard copies of previous theses are available for you to have a look at through the Biology Teaching and Learning Centre (contact rsb.studentadmin@anu.edu.au).

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

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”. OK, we can’t spell.

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

VI. Academic Honesty and Plagiarism

The University has strong policies to try to ensure academic honesty, and any breaches can result in severe penalties. You should by now have a good idea what is acceptable academic practice, but if in doubt consult your supervisor. Please also look through the university's policies:

Academic Integrity

Office of the Registrar, Student Misconduct - Staff Services - ANU

Plagiarism is one form of academic dishonesty that you should be careful to avoid. Plagiarism means copying or closely paraphrasing published work and passing it off as your own. Be extremely careful if you ever electronically copy any material from another source; never insert it directly into your work, even if you intend to re-write it later. *Plagiarism 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.

Please be aware that taking sections from another thesis is also plagiarism and will be penalised severely. Even 'recycling' previous material from your own work can be considered misconduct; seek advice if you are uncertain.

VII. Life after the Course

A. Postgraduate Research (PhD) Scholarships

Students intending (or even just contemplating) to go on to undertake a PhD at ANU or elsewhere in Australia need to be aware that Australian Government Research Training Program (AGRTP) Stipend Scholarship applications close at the end August (for international students) and the end of October (for Australian/New Zealand citizens). An AGRTP International Fee offset scholarship is typically awarded to international students awarded an AGRTP stipend Scholarship. RSB also offers additional RSB International PhD scholarships, including one specifically for students who have completed a Masters program in RSB.
Some of the more common questions:

- *Are there other scholarships available?* Yes, search here for more information.
- *When should I submit my scholarship application?* You can apply at any time during the year. For your benefit apply by mid-August (eg before the thesis writing begins in earnest).
- *How do I apply?* Apply online here or email here for more information.
- *Can I apply for a PhD scholarship at more than one University*? Yes, this will provide you with more options to consider.
- *Am I eligible to do a PhD with a H2A result?* Yes, however you will not be eligible for an AGRTP Scholarship at ANU unless you also have publications or a sufficient level of relevant research experience.
- *Do I have to pay tuition fees if I get a PhD scholarship?* This varies depending on the scholarship you are awarded. Email here for more information.
- *If staying on in RSB, do many students swap labs to do their PhD?* This is relatively common. Most (not all) awarded scholarships are mobile, allowing the students to enroll with any eligible supervisor in RSB.
- *Who can I discuss my PhD options with?* Email here for details of who best to contact.

B. Publishing your project

Many projects are of sufficient quality that they can be written up as a paper for a journal. This is to everyone's advantage. You would then have a publication, which is a great personal achievement as well as being useful 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 often 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 will not necessarily make a good journal paper. 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, the minimal amount of your data that 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 will be asked to make changes, even if it is accepted for publication.

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 Science Submission Guidelines for Honours Students

College Guidelines are available at:

http://science.anu.edu.au/current-students/forms-policies-guidelines/2018-honours-submission-guidelines

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

- Each student must upload one PDF copy of their thesis to the Science Honours Thesis Submission site in Wattle by the due 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.

Theses submitted after the due date will be penalised by 5% 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.

No application for an extension will be considered unless the Milestone Completion Form is fully completed. The form is kept at the Biology Teaching and Learning Office and you will be prompted to sign it on the appropriate dates. The Milestones to be completed are:

- Proposal seminar
- Grant proposal
- Mid-course seminar and/or progress report.
- A month before submission both the student and supervisor sign off on the scope of all major data collection/field work/experiments/calculations/background reading that are required for submission.
- Two weeks before submission both the student and supervisor 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:

https://policies.anu.edu.au/ppl/document/ANUP_000726

http://www.anu.edu.au/students/program-administration/assessments-exams/academic-honesty-plagiarism

It is the responsibility of each 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 acknowledging the work of another person with the intention of representing this as the student's own work. This remains plagiarism whether it is with the knowledge and consent of that other person or not.

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. (Discipline Rule 2021 (legislation.gov.au))

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 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

CANDIDATE AND SUPERVISOR EXPECTATIONS AGREEMENT

1. Candidate and Supervisor Expectations Agreement Form

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

1. Grant Proposal Form

(electronic version on Biology Honours wattle web site)

Biology Honours Program BIOL4001F & Master Research Project BIOL8701

Use double line spacing. Email a copy to rsb.studentadmin@anu.edu

DELETE the instructions on this form prior to submitting your finalised proposal.

1. Student Name:

2. Student ID:

3. Supervisor(s): *I declare that my supervisors have read the proposal.* ☐

Supervisor Name

Supervisor Name

Date:

4. Project title.

Short descriptive title, not exceeding 20 words.

5. Grant Proposal

This section 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. Numbered or non-numbered citation styles may be used. DO NOT ALTER PAGE MARGINS.

Format instructions (Section headings are shown in bold type):

Overview

- This serves as the "first page" of your proposal (*ie.* approximately 100-150 words, possibly including an accompanying figure if possible). \
- This section should succinctly describe the broader context of the research area/field to be examined, your research objective(s) and its significance. This section should finish with a sentence (or two) that outlines the anticipated outcome(s) and benefit(s).

Introduction

- This should provide a review the primary research literature relevant to your proposed research (*ie.* what information do I need to give so that a non-expert can understand the objective and significance of my research).
- Break up the information into sections using sub-headings to help guide the non-expert reader.
- Structure the text and figures so that the importance of your research is put in the context of what is already known on your topic.
- If relevant, include a section describing your particular study system or species.

Project aims

- Describe the specific aims/hypotheses your project seeks to address/test. You can formulate your aims in terms of the questions you seek to answer

Significance

- Explain the significance of your proposed research. Why is it important and interesting?

Research Plan

- This should explain the experimental work you will undertake to achieve your aims.
- Consider using sub-headings that break up the information into separate sections for each aim OR use sub-headings pertaining to each experimental analysis you plan to do.
- Enough experimental detail should be provided for the examiners to judge (1) whether the approach is suitable, (2) likely to work and (3) demonstrate you have adequate conceptual understanding of the methodology and what it seeks to measure.
- Include what equipment you will use, and what field observations, experiments or data collation you will carry out. It is important to provide some justification for your choice of methods.
- If space permits, present figures (and explain) any relevant preliminary data your project seeks to expand upon.

- Think in advance about the statistical tests you will use to analyze your data. This can influence the way you design your experimental setup. Include statistical information relevant to your experimental design. (note; the examiners will understand that you won't necessarily be an expert in statistical methods at this stage).

Research Timetable

- This provides a planned timeline for when each component of your research plan will be carried out and is usually shown as a figure or table.
- Data collection should normally finish at least two months before your thesis is due.

6. References

- It is recommended that you manage references using Endnote
- 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).

Figures

Ensure they are legible (ie. don't use font that is too small and ensure the resolution of the figure is not blurred) and fully (and correctly) annotated. The legend should contain sufficient detail so the reader can interpret what information the figure is relaying without reading the main body of text.

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 is designed 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:

i) That the research proposed is appropriate for the project.

ii) If statistical techniques are required, that they are appropriate.

iii) 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.

iv) 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;

i) You have read both the Roles and Responsibilities of Examiners and the assessment standards and

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

Marks:

Consensus mark:

Chair of Examiners Name	Signature:	Date
Examiner Name		
Examiner Name		

Criteria for Assessment of Grant Proposal

Grades must be based on the actual written proposal, not on potential.

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

- have 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 IB): 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 tis 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.*

APPENDIX 4

THESIS ASSESSMENT DOCUMENTS

1. Guide to Examining Thesis

2. Criteria for Assessment of Thesis

3. Thesis Marking Guide

GUIDE TO EXAMINING THESIS

(INFORMATION FOR EXAMINERS AND STUDENTS)

ASSESSMENT OF THE THESIS

- 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 with the student the structure and content of this chapter and may comment on a 1-2 page outline.*

- 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

Prior to the oral discussions, examiners should discuss their views on a mark for the thesis.

IMPORTANT: The oral discussions themselves are not marked. Their purpose is to help the examiners arrive at a final consensus mark for the thesis based on the thesis assessment criteria set out below. With the thesis assessment criteria in mind, the oral discussions should seek to clarify any parts of the thesis that are unclear, to gauge the independence of the student's work, and to highlight strengths and weaknesses in the student's background knowledge. The object of assessment remains the submitted thesis, however, and an impressive oral discussion cannot redeem a poor thesis.

The main discussion will normally take at least 30 minutes and should not exceed 60 minutes. Due to the restricted 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. Following this discussion, the examiners meet with the student alone, and then with the supervisor alone. Guideline questions for each of the three discussions are given below.

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?

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 special circumstances, either personal or project-related, that may have negatively affected the thesis? Special circumstances are serious issues beyond the student's control (eg. medical or family emergencies, major technical problems), the negative effects of which were not wholly mitigated by the granting of extensions. *Note: special circumstances should not be factored into the examiners' consensus mark but should be flagged in their report for discussion at the final examiners' meeting (see below).*

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 special circumstances, either personal or project-related, that may have negatively affected the thesis?

ARRIVING AT A CONSENSUS MARK

Directly following the oral discussions, the examiners will agree on a consensus mark for the student's thesis, based solely on the extent to which the thesis fulfils each of the thesis assessment criteria set out below, and taking into account any relevant information about the thesis arising from the oral discussions (eg. clarifications, student's independence, background knowledge). A marking guide based on the assessment criteria is attached.

IMPORTANT: Special circumstances identified by either the student or the supervisor during the oral discussions should not be factored into the consensus mark; these should be flagged in the confidential section of the examiners' report (see below) for discussion at the final examiners' meeting. Also, the student's potential to do postgraduate research must not influence the examiners' consensus mark.

Once a mark has been agreed, the examiners should invite the supervisor to 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. Alternatively, the Chair may discuss the mark in person with the supervisor as soon as possible after the Oral, and before the Examiners' Meeting.

EXAMINERS REPORT

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 (1-2 pages) justifying the mark in terms of the thesis assessment 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 any of the oral discussions.

Any confidential comments should be confined to the page marked CONFIDENTIAL which will not be shown to the student. This page should also flag any special circumstances for discussion at the final examiners' meeting.

The last page of the report should be in a form that can subsequently be shown to the student. Examiners should be prepared to speak to their report at the final examiners' meeting, especially when marks are near grade boundaries or there are special circumstances. In these circumstances the Chair, at least, should attend the meeting.

Criteria for Assessment of Thesis

Grades must be based on the actual written thesis, not on potential.

>90% (Honours IA): 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 IB): 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 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 ----------

BACKGROUND LITERATURE		Fail <50	H3 50-59	H2B 60-69	H2A 70-79	H1 80-89	H1 high >90%	
Knowledge	Superficial summary							Excellent, extensive, well-integrated
Understanding	Significant omissions or errors in understanding							Clear understanding of all material
Critical analysis	No analysis							Critically analysed
APPLICATION OF RELEVANT KNOWLEDGE TO THE PROBLEM								
Overall assessment	Poor							Clear, consistent and effective application
Experimental design & techniques	Little understanding of techniques used							Clear understanding of all techniques used
**Interpretation of results*	Inadequate, uncritical							Excellent, critical, appropriate
**Discussion of results*	Incomplete, uncritical, lacking logic, unimaginative							Thorough, critical, logical, imaginative
PRESENTATION OF RESULTS & WRITING STYLE								

Overall assessment	Inappropriate, sloppy, incomplete, inaccurate							Clear, correct, succinct, in appropriate format
Syntax, Spelling, Grammar	Difficult to read, lacking fluency							Easy to read, fluent, clear and unambiguous
Layout	Untidy, badly organised							Visually attractive, well-organised, legible
Figures and Tables	Untidy, poorly labelled							Well-structured, labeled and integrated with text
Citations	Some missing, inconsistent format							Accurately referenced
Bibliography	Some missing, inconsistent format							Wide range of sources, accurately referenced
STATISTICAL ANALYSIS & APPRECIATION OF LIMITATIONS								
Statistical analysis	Not performed							Correct and appropriate analysis, clearly understood
Limitations of experimental design	Little or no appreciation							Exceptional appreciation
Limitations of results obtained	Little or no appreciation							Exceptional appreciation
HYPOTHESES & FUTURE EXPERIMENTS								
Hypotheses	No hypotheses generated							Hypotheses generated
Future experiments	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:

Robertson Building (#46), Linnaeus Building (#134), CSIRO or The Canberra Hospital. You may also be temporarily in the Banks Building (#44) or Gould Building (#116), but these will be vacated by March. 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 in each building.

2. Security and Emergency

For ANU Security, phone 52249. Most buildings have defined opening hours Monday to Friday. Outside the 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 out of the building at night, ring Security.

Thefts occur in unsecured areas of buildings from time to time. Thieves mostly target money (wallets and purses), laptops and 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

The University no longer uses carrier pigeon to convey messages to students, although they are regularly used among staff. (Staff also employ wood ducks for this purpose; you will see many striding across campus.) Instead, for students, we use ‘electronic mail’, or ‘e-mail’ for short. We will use your ANU email address, so ensure you check this e-mail account every workday, even if you have another account. Email messages may contain critical information relating to power and water outages and security. You will also receive notices from the Convener or the Student Administrator.

Post official snail-mail in either the "Internal" (ANU; usually green) or "External" (elsewhere; usually blue) mail bags.

4. Desk & Laboratory Space

You will be allocated your own desk space, and your supervisor will also provide research space. 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) Never 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 work.

7. Animal Experiments and permits for collecting

All research on live animals must be approved by the Animal 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 research techniques, trauma is minimised, and that the number of animals involved is scientifically justifiable. BEFORE undertaking ANY research on live animals: 1) you must attend the animal ethics seminar; and 2) a proposal form must be completed by your supervisor and approved by the Committee. See your supervisor first. The term "research" is interpreted widely and includes visual observations 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 others. You must ensure you have sufficient training to use this equipment and you return it 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 repair and manufacture equipment but ensure you allow plenty of time. 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 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. 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, eg. 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. (See https://policies.anu.edu.au/ppl/document/ANUP_001222 .

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) You must follow 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 your 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 obtained an ANU Driving Authority – this can be arranged through your STO. School regulations on the use of vehicles are posted on the RSB Intranet; these must be strictly adhered to. In particular note that:

(a) Drivers with Provisional licences must display P plates,

(b) you may drive university 2WD vehicles only after you have an ANU Driving Authority and have permission from the STO,

(c) you are not permitted to drive university 4WD vehicles unless you have attended one of our 4WD familiarization 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 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.

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 RSB Operations. Vehicle booking is done by an online system accessible from the RSB intranet pages. Only people with ANU Driving Authorities can 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, leaving the vehicles dirty, or failing to return the vehicle at least half full of fuel. 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 undertake 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 also

complete and submit the relevant online travel form(s) to cover all fieldwork episodes – even local ones. These forms are a checklist to ensure that you have evaluated any risks and take appropriate action and give 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 worker's 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. Anyone helping you in a volunteer capacity should be informed by you of these conditions before they start.

You are directly responsible for any volunteer you bring into the building and must be present and provide supervision. You will be responsible for ensuring 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 students 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 distance calls. If you want to make an external call, contact your supervisor.

17. Student representative

Students will be asked to elect a representative who is invited to a student representative meeting twice a year.

18. Statistical Advice

You are likely to require statistical advice during project planning and subsequent analyses. Consult your supervisor, and if necessary, the ANU Statistical Consulting Unit. Your supervisor should attend at least the first meeting with the Consulting Unit. There may be a delay of 1-2 weeks in getting appointments so plan ahead.

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

19. Harassment and Discrimination

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. By contacting the appropriate people you can help ensure that it does not continue or happen to anyone else.

20. Use of the Tea Rooms

You are encouraged 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. Social events

Social events are often run for all RSB personnel and you are warmly encouraged to attend.