THESIS INSTRUCTIONS
Writing and Submission Guidelines (Class of 2017)

DATES AND DEADLINES

1. **Friday April 14, 2017 by 12 noon:** SUBMISSION DUE
   Deadline for submitting copies to your thesis committee.

   **NEW THIS YEAR:** Preferences vary among the faculty for the submission of the thesis, i.e., preference for a hard copy, electronic copy, or both. Please consult this list to verify the preferences of your committee members:

   **Electronic Copy:**
   - Clotfelter
   - Hood
   - Miller
   - Poccia
   - Trapani
   - Williamson
   - Levin

   **Hard Copy:**
   - Graf
   - Ratner

   **Both:**
   - Goutte
   - Jeong
   - Purdy
   - Temeles

   **Hard copies of rough draft:** Place paper copies in the designated location on the shelves under the clock in the Biology Department Office area. Prepare the copies on paper as specified below in the section entitled FINAL SUBMISSION OF THE THESIS.

   **Electronic Copies of rough draft:** The electronic copy should be in pdf format, except for supplementary data, such as videos, that cannot be converted to pdf format. Karen Racz, Biology’s Academic Department Coordinator, also has blank CDs for creating electronic copies.

2. **Sunday April 23, 2017 2:00 p.m. – 9:00 p.m.** DEFENSE (i.e. Presentation)
   The schedule for the thesis presentations (also called “Defenses”) will be announced and posted as the time approaches.

3. **Thursday April 27, 2017 by 3 p.m.:** FINAL SUBMISSION DUE
   Deadline for submitting final, corrected copies of your thesis. This includes a hard copy to the Registrar, one hard copy to your Biology advisor, and an electronic copy to Biology.

   **One Electronic Copy:** The electronic copy should be in pdf format, except for supplementary data, such as videos, that cannot be converted to pdf format. Send the electronic copy to Karen Racz, Biology’s Academic Department Coordinator, at kracz@amherst.edu. Karen also has blank CDs for creating electronic copies should you prefer to give them to her directly.

   See FINAL SUBMISSION OF THE THESIS for details.
BASIS OF THESIS EVALUATION

Your grade and Honors recommendation for Biology 498/499 are based on your thesis work, and also on your thesis as a document, as submitted on April 14th. Some students work hard during the year but do not set aside enough time to do a good job in preparing the thesis document. What is available to the faculty is the thesis itself, but not necessarily all the late nights in the lab. If what you submit on the due date is not in final form, i.e. if it requires significant revision to bring it into line with these guidelines, your grade and Honors will be affected, no matter how much work you've done during the year. The expectation is that there will be only minor typographical corrections after the April 14th submission of the thesis.

The Department will make a recommendation for Latin Honors (cum laude, magna cum laude, or summa cum laude) on the basis of your Honors work. In making their recommendation, the Biology faculty will not take into account (or even be aware of) your grade point average. However, the level of Latin Honors that is finally awarded may be affected by your grade point average as determined by the Registrar after all grades have been submitted.

ADVICE ABOUT TIMING

During the Spring semester, work out well in advance a schedule for submission of drafts to your Advisor to ensure that the thesis in final form is ready for submission on the due date. The final stages of preparation take more time than you expect! This includes making figures, tables and legends, plus preparing the Table of Contents and List of Illustrations.

Allow much more time than usual to print your thesis in the Computer Center because of the seasonal crush of other thesis printing jobs. After reviewing each section, it is very desirable for your Advisor to be able to see and comment on a complete copy of your thesis containing your revisions ten days or so before the final printing. Give yourself days rather than hours for duplicating the thesis and submitting it to the faculty—things often don't go as expected, and without extra time built into your schedule, you may not be able to meet the deadline with a document you are happy with. Most important: frequently, back up your data and text.

THESIS FORMAT AND STYLE

The sections of the thesis are as follows: Title Page, Table of Contents, List of Tables, List of Figures, (List of Abbreviations, if applicable), Abstract, Acknowledgments, Introduction, Methods (or Materials and Methods, if you prefer), Results, Discussion, Conclusions, and References. Conclusions may be omitted as a separate section, and included instead in the Discussion. Number all pages consecutively, including figures and figure legends.

Formatting requirements:

- Spacing: Double-spacing required except for references which can be single-spaced.
- Font Size: 12 point.
- Paper size: 8 1/2 x 11 inch.
- Margins: at least 1 inch at the top, bottom and right side, and 1.5 inches on the left.

You may choose whether or not to “right-justify” the text. Don't “orphan” a title or caption by leaving it as the last line on a page; if this happens, add blank lines at the bottom of the page so that the title will appear at the top of the succeeding page.
THESIS CONTENT

Style and content:
Biology theses should be understandable by all faculty and other senior majors in Biology, so terms must be identified and explained adequately. Use nonstandard abbreviations only to avoid frequent repetition. If you use abbreviations, define them in parentheses or in a footnote at their first mention, and include them in a List of Abbreviations at the beginning of the thesis.

Citing references:
1. Throughout the thesis text, cite references by author(s) and year. Numerical references (e.g. “Sequencing the gene for the sodium channel led to predictions of the channel Architecture…”) are not acceptable in Amherst College Biology theses.

2. If a paper has either one or two authors, include the last name or names and the date in all citations to the paper: “Watson and Crick (1953) first showed…” or “The nucleotides in DNA are arranged in a double helix (Watson and Crick, 1953).”

3. If the paper has three or more authors, list the first author followed by et al., which is always underlined or italicized. For variety, consider occasionally writing out the English meaning of et al., which is “and colleagues”: “Noda et al. (1986) reported the sequence for the gene for the sodium channel…” or “In 1986 Noda and colleagues reported…”

4. Organize your references alphabetically by author, and, for a given author, chronologically. Two or more papers by the same author or set of authors in the same year should be listed as 1987a, 1987b, etc., both in the thesis text and in the References section. Each combination of two or more authors is treated as a different author. The format for listing references in the References section of the thesis is detailed below.

5. If you wish to refer to a paper which you weren’t actually able to obtain and read but which was discussed and cited in a paper you did read, list only the paper you did read in the References section. For example, “Carpenter (1962), as pointed out by Jones (1966), argued that…” You would cite Jones (1966) in the References section, not Carpenter (1962).

SPECIFIC SECTIONS OF THE THESIS

Abstract. The abstract should be an approximately one-page summary of the thesis. It should be as specific as possible, consistent with brevity. For example, avoid writing “The implications of these results are discussed” and, instead, actually summarize the discussion.

Introduction. Begin with a statement of the problem addressed in your research. Then provide a detailed literature review of previous work relevant to the problem. End the Introduction with a statement of the specific rationale for your approach to the problem.

At an early point in the thesis—either in the Introduction or in Methods—name any organisms with which you worked, giving both the common and scientific names. Species names are underlined (Drosophila melanogaster) or italicized (Drosophila melanogaster).

Use the past tense in describing specific findings of papers you cite. Thus: “Raymond (1979) found a supernormal period in sciatic nerve fibers…” not “Raymond (1979) finds a supernormal period…” Use present tense only for very well-known conclusions of cited papers or for
accepted, basic facts that do not require citation: “There exists a concentration gradient of ions across all nerve membranes."

**Methods.** Include details sufficient to allow a competent worker to repeat the experiment. Thus the methods will be more detailed than in most scientific papers. The *Methods* section of a thesis is not a laboratory protocol written in the imperative (“Adjust the pH to 7.4”), but rather a description of the methods that were used (“The pH was adjusted to 7.4”).

**Results.** Describe your results in words and also using tables and figures (i.e. graphs and illustrations). Figures should be located near their first mention in the text. Each figure must be accompanied by a legend, on the same page or on an adjoining page, even though the figure is also explained in the text. Legends should include a figure number and identifying material. Figures and tables must conform to the same margin requirements as other parts of the thesis.

**Photos:** The illustration should identify structures of note in your results. For example, don’t say “Note union of aedaegus and uncus” without indicating what and where the aedaegus and uncus are on the photo. Indicate magnification wherever appropriate.

**Graphs:** The format and labelling of axes should be as prescribed by a major journal in the field and should be consistent throughout the thesis.

**Discussion.** The *Results* section of a thesis should contain only a statement and presentation of the results, saving the discussion (i.e. interpretation, conclusions, and suggestions for further work) for the *Discussion.* A common mistake is to use the *Results* section to discuss as well as to present results, and then, having nothing left to discuss, to use the *Discussion* section for vague speculation.

**References.** The format for citing papers in the *References* section may be that of any major journal in the area of Biology in which you are working, but must include:

- All authors (no matter how many)
- Year of publication
- Title of the paper
- Name of the journal (*underlined* or *italicized*)
- Volume number
- Inclusive pages (not just the first page)

**Citations.** We recommend writing out the complete name of the journal. However, it is acceptable to abbreviate if you feel you must, so long as the name remains intelligible. For example, *Journal of Molecular Biology* could be abbreviated as J. Mol. Biol., but not J. M. B. Examples:


References to books should give the same information as for journal articles, and in addition, the title of the book, the editors (if appropriate), publisher, and the city of publication. Titles of books should be *bolded* in the *References* section. Example:

PRINTING AND COPYING YOUR THESIS
All printing and copying should be carried out in the Computer Center or other facilities rather than the Biology printers or copying machine. You may, however, obtain blank CDs for creating the electronic copies from Karen Racz, the Biology Academic Department Coordinator. Plan ahead; this part takes longer than you think.

THESIS PRESENTATION
After handing in your thesis, you will give a Thesis Presentation (sometimes called the "Defense") to Biology faculty and students. They are scheduled for Sunday, April 23rd. There is an understandable feeling of being finished when your thesis has been turned in, but be sure to plan time to consult with your Advisor about your thesis presentation.

FINAL SUBMISSION OF THE THESIS: Thursday, April 27, 2017
Following submission of your thesis on Friday, April 14th, the Biology Faculty will review your work. If committee members or others have suggestions for improvement and/or corrections, they will either contact you directly or give comments on hard copies of the thesis and put it back on the shelf in the Bio Office. You can expect to find them there by Friday, April 21st or earlier. As soon as you receive comments back from your readers you can begin to incorporate any necessary changes, and you should consult with your research Advisor for any major corrections. Once all corrections have been incorporated, you are ready to compile the final copies of your thesis. If the corrections are minor, you can do this simply by replacing any corrected pages in the two copies of the thesis, rather than reprinting them entirely. It is your responsibility to make the requested changes on both copies of the thesis. One copy of your final thesis (the one brought to the Registrar) will be for the College Archives, and therefore to ensure preservation, must be on alkaline buffered bond paper (and must not be chemically treated) of 20 pound weight such as Cranes thesis paper or Howard Permalife Bond. Our understanding is that all paper for laser printing at the Computer Center meets the standard for the archival copy. If only one copy is on the archival paper, please mark that copy as such. The other copy may be on any grade of paper. Please tape your name to the outside of all copies of your thesis but do NOT glue a label onto the binders. Make sure you write your name and class year on the CD. We recommend that you make a third final copy of your thesis to keep for yourself (if you don't do it now, you'll never do it!).

By 3 p.m. on Thursday April 27th, you must bring one final paper copy (on archival paper, see note above) to the Registrar, and one final paper copy and the final electronic copy to the Biology Department. Please note that YOU are responsible for getting your thesis to the Registrar. The Biology Faculty take seriously the College final deadline for turning in theses to the Registrar, and will not advocate on behalf of students who fail to turn in the required copies of their corrected theses.

The electronic copy should be in pdf format, except for supplementary data, such as videos, that cannot be converted to pdf format. Give the electronic copy to Karen Racz, Biology's Academic Department Coordinator.
Breathe a huge and proud sigh of relief!

Congratulations on seeing this complex process through to the end!