

## Format for Preparation of a Biology Undergraduate Honors Thesis

The following document describes the required format for the preparation of The Honors Thesis for Biology (BI 401, 402). This format has been developed based on previous experience with these documents, and is designed to ensure a degree of consistency. In addition, these stylistic rules mimic the rules that one would follow when submitting a manuscript to a scientific journal. The thesis will be graded, in part, on the ability of the student to adhere to these guidelines. If specific questions are not answered herein, please consult your major professor for advice or the Biology Research and Honors Committee Chair.

1. The first page must be a **Title Page** and must include the following information: the title (in capital letters); your name and BU identification number; and

Honors Thesis  
submitted in partial  
fulfillment of the requirements  
for  
Honors in Biology  
  
Month, Year

2. The second page must be a **Signature Approval Page** and should be organized, for example, as follows:

First Reader: \_\_\_\_\_  
Dean Tolan, Professor of Biology

Second Reader: \_\_\_\_\_  
John L. Celenza, Associate Professor of Biology

Third Reader: \_\_\_\_\_  
Kimberly A. McCall, Professor of Biology

3. The third page must be an **Abstract**. The Abstract should be approximately 300 words (or about one page in length), and should describe the general subject, the results that were obtained and the conclusions that were drawn.

4. There should then be a series of **Chapters** describing individual topics. The text in the following sections must be double-spaced, should be typed in a 12-point font, and margins should be one inch all around.

a. The first Chapter will provide an **Introduction** to the research topic. This should include a brief and general statement of the background and importance of the research, followed by a

discussion of relevant literature. It is likely to end with a paragraph describing the research question to be addressed in the thesis.

b. The second Chapter will describe the **Materials & Methods** used in the research. It should be divided into sections as relevant to individual methods used in the research (e.g., Plasmid Preparations; DNA Sequencing; Cell Culture; Western Blotting, etc.). Each method should be described in sufficient detail that one could reproduce the experiment. However, if methods included in the thesis have been described extensively elsewhere, they can be referred to "as described previously (Doe et al., 1995)".

c. The third Chapter will describe the **Results**. The Results section will also likely be divided into subsections to reflect the different topics addressed by the research. A typical Results subsection will generally be organized with a general statement of the question to be determined, and will be followed by the experiment that was performed, by a description of the Results that were obtained and the controls that were performed, and by a brief conclusion of the experiment.

d. The fourth Chapter will be a **Discussion** of the research. Although it is certain that one will refer to the research described in the thesis, the Discussion is not meant to be a rehashing of the Results section. The Discussion will describe the implications of the research (in light of other research), problems in interpretation of the results, and questions that remain unanswered.

e. In some cases, an **Appendix** may be added at the end of the text. The Appendix may include primary data or other relevant information that does not appropriately fit into the body of the text.

5. **Tables and Figures.** Tables and (then) figures should be placed after the References (see below) and before the Appendix.

a. If figures or tables are taken from other sources and included in the thesis, the source from which the information has been taken must be cited, such as "(taken from Doe et al., 1995)" or "(adapted from Doe et al., 1995)".

b. Figures must have legends that adequately describe what is shown in the figure. The legend should have a one sentence title. The body of the legend should describe briefly the experiment or figure that is shown in the figure. All lanes, arrows, bars, abbreviations, etc. must be defined in the figure legend.

c. Tables should have a title of the topic of the table, e.g., Table 1 Growth of Cells in Reduced Oxygen. Each column of the table should have a heading. If necessary, describe columns or values by placing a superscript next to the relevant column or value in the figure and place superscripts with descriptions at the bottom of the Table.

6. A comprehensive list of **References** must be included at the end of the text, and information taken from references must be cited properly within the text.

a. **Listings in the comprehensive list of References** must include all authors, the year published, the full title of article, journal or book, volume and inclusive pages.

References must be ordered alphabetically in the final Reference List. If a given first author has multiple citations, these should be ordered chronologically in list (starting with the earliest publication). If a given first author has multiple papers in a single year, they should be designated by "a" and "b" (e.g., Doe et al., 1988a; Doe et al., 1988b, etc.), and should be ordered alphabetically by first letter of second author's last name.

All references included in the final Reference List must be cited at least once within the text of the paper, and all references cited within the text must be included in the final Reference List.

The following provides examples of the REQUIRED format for references:

**Chapter in a book:**

Bradley, A. (1987). Production and analysis of chimeric mice. In, Teratocarcinomas and Embryonic Stem Cells: A Practical Approach, E.J. Robertson, ed. (Oxford, UK: IRL Press). pp 113-151.

**Book:**

Cooper, G.M. (1997). The Cell: A Molecular Approach. (Washington DC: ASM Press).

**Journal articles:**

Maillet, L., Boscheron, C., Gotta, M., Marcand, S., Gilson, E., and Gasser, S.M. (1996). Evidence for silencing compartments within the yeast nucleus: a role for telomere proximity and Sir protein concentration in silencer-mediated repression. *Genes Dev.* 10, 1796-1811.

Venema, J., Mullenders, L.H.F., Natarajan, A.T., van Zeeland, A.A., and Mayne, L.V. (1990). The genetic defect in Cockayne syndrome is associated with a defect in repair of UV-induced DNA damage in transcriptionally active DNA. *Proc. Natl. Acad. Sci. USA* 87, 4707-4711.

Wilson, V.L., and Jones, P.A. (1983). DNA methylation decreases in aging but not in immortal cells. *Science* 220, 253-260.

b. **Citations within text** must provide author(s) and date, and be provided in chronological order in parentheses. If two authors, use (Wilson and Jones, 1983); if more than two authors, use (Maillet et al., 1996). If multiple citations are given for a single point, they should be separated by semicolons and ordered by year. That is, the above references would be cited in the text as (Wilson and Jones, 1983; Bradley, 1987; Venema et al., 1990; Maillet et al., 1996; Cooper, 1997). If one discusses a specific study within the text, include only the year in parentheses; for example, "Maillet et al. (1996) showed that..."

7. **Abbreviations.** In general, abbreviations should be defined within the text the first time they are used; for example, "The polymerase chain reaction (PCR) was used to amplify..." However, the following standard abbreviations should be used without first describing them:

DNA	deoxyribonucleic acid
RNA	ribonucleic acid
sec	second(s)
min	minute(s)
h	hour(s)
M	molar
mM	millimolar
$\mu$ M	micromolar
m	meter(s)
mm	millimeter(s)
$\mu$ m	micrometer(s)
l	liter(s)
ml	milliliter(s)
$\mu$ l	microliter(s)

8. **Solutions.** The first time that a solution or assay buffer is named (usually in Materials and Methods) the ingredients should be listed in parentheses, as in the following example:

Following heating, 400  $\mu$ l of immunoprecipitation buffer (100 mM NaCl; 20 mM Tris-HCl, pH 7.5; 0.5% NP-40; 1 mM EDTA; 1% aprotinin) was added to each sample.

9. Final copies of the thesis must be distributed to the sponsoring Faculty member and other Thesis Committee members. In addition, a final copy needs to be emailed to Stacy Straaberg Finfrock for departmental archiving.