

MCDB Honors Thesis Guidelines:

The honors thesis should adequately capture and describe the research carried out during the three quarters of honors work. The paper should be in the format of a journal paper, please use the format of the journal *Development*. However, the honors thesis should contain the following sections:

1. Title
2. Abstract (summary)
3. Introduction
4. Experimental Design*
5. Materials and Methods
6. Results
7. Discussion
8. Further Experiments*
9. References

*Sections designated with an asterisk are not mentioned in the Preparation of Manuscripts page of the journal, *Development*. These sections are required for the Honors thesis in addition to those listed in the journal.

PLEASE NOTE: It is not a requirement that experiments work or yield a publishable result. It is important to analyze the experiments, and particularly in the case where few results were obtained, to suggest further experiments that might shed light on the problem. The "Experimental Design section and the "Further Experiments" section are important in demonstrating the student's understanding of the experimental system.

The paper should reflect only the student's own experiments and should be completely written by the student (a copy of a multiauthored publication or paper submitted for publication cannot be substituted for an honors thesis).

The paper should also include figures, tables, and legends to both.

The Introduction section should be a review of the field of study, and should be a minimum of 1500 words, with at least 15 literature citations.

The Discussion section and Further Experiments sections combined should be a minimum of 2000 words.

The Introduction and Discussion sections should demonstrate knowledge of the larger field, and represent a minireview of the topic of the paper.

The entire thesis should not be more than 8,000 words total.

The thesis must have been read and signed by the research sponsor of record prior to being turned in to the MCDB department. The thesis must carry the recommendation of the thesis sponsor and receive final approval from the Undergraduate Honors Committee in order to be awarded departmental honors. Please feel free to make an appointment to discuss your honors thesis with Dr. Steve Jacobsen, Undergraduate Honors Advisor at any point in your progression through the Honors Program.

SUGGESTED FORMAT FOR MCDB 198A-B,C HONORS THESIS

Editorial Comments:

- The honors thesis should adequately capture and describe the research carried out during the three quarters of honors work . The exact format outlined below need not be followed, but the paper must contain the information detailed in it. Your paper should be long enough to capture and describe well the required information, at least fifteen pages in length (double-spaced). See below for specific word counts for Introduction and Discussion/Further Experiments sections.
- The paper should reflect only the student's own experiments and should be written completely by the student (a copy of a multi-authored publication or paper submitted for publication cannot be substituted for an honors thesis).
- The paper should be in the format of a journal paper, please use the format of the journal *Development*. However, the honors thesis should contain the following sections:
 1. Title
 2. Abstract (summary)
 3. Introduction
 4. Experimental Design*
 5. Materials and Methods
 6. Results
 7. Discussion
 8. Further Experiments*
 9. References

*Sections designated with an asterisk are not mentioned in the Preparation of Manuscripts page of the journal, *Development*. These sections are required for the Honors thesis in addition to those listed in the journal.

The paper should also include figures, tables, and legends to both.

- Papers should be prepared using a word processing program, and must be double-spaced, to allow for any modification between draft and final version. The word count of the entire document (including figure legends and references) should not exceed 8,000. Be sure to use spell checking and (if you have it) grammar checking options.
- Your name and undergraduate ID number should appear in the upper right hand corner on every page after the title page (you can do this easily by using the header function)
- All papers must have literature citations -- usually in the Introduction and Discussion—and a reference list at the end. Your thesis should contain at least 15 literature citations that should appear in both the body of the paper and a reference list. Look up and use the literature citation format (for both citations in the text of your paper and the reference list at the end) in the journal *Development*.

Sample reference list entry in the style of *Development*:

Turner, D. C., Flier, L.A. and Carbonetto, S. (1987). Magnesium-dependent attachment and neurite outgrowth by PC12 cells on collagen and laminin substrata. *Dev. Biol.* **121**, 510-525.

I. **Title Page** should include the following information:

- A. The title of your paper
- B. Your name and undergraduate ID number.
- C. The course number (198A, 198B, or 198C) and the quarter.
- D. Your research sponsor's full name, telephone extension and e-mail address
- E. Except for the title page, all pages should be numbered

II. **Abstract** (limit to one page)

**This should incorporate, expand on and refine the problem statement you initially wrote. It should not carry the level of detail that exists in the body of the paper, but should:

- A. Clearly define the problem
- B. Why do this research
- C. How it will be done (how sensitive are measurements, what resolution will you get)
- D. What form will the results take?
- E. State any conclusions reached.

III. **Introduction and Literature Review**

- A. Describe the general phenomenon under consideration (note relevant history, background studies).
- B. The Introduction section should be a review of the field of study, and should be a minimum of 1500 words with at least 15 literature citations.
- C. Focus on the specific point of your study; state its relative importance.
- D. State purpose of your study; research question(s) being asked or hypothesis (es) being tested.

IV. **Experimental Design**

- A. This should be an overall explanation of the kinds of experimental methods that would be necessary to answer your research question(s) and why this kind of design is most appropriate.
- B. Refer, if necessary, to previous lines of research from which your experimental design is drawn.

V. **Methods**

Site of experiments; collection and maintenance of organisms.

- A. Specific design of each experiment or series; sequence of manipulations; controls (include here such things as glassware, tools, time, temperature, volumes, illumination, sampling, replication, numbers, weights, etc.)
- B. Analytical techniques: how you acquired and analyzed your data.

VI. **Results**

- A. Motivation statement (repeat for each experiment you performed), e.g.,
"To determine if . . . how much . . . whether or not . . . I measured counted . . . labeled . . . sampled . . . the effect of x on y . . . the amount of x accumulated in time . . .

the number of x per liter . . . etc. The data show . . . [give results} . . . (Table A) or fig.)."

- B. Describe the data.
- C. All figures and tables should be able to stand alone; that is, they should be labeled in such a way that reading them alone would allow the reader to fully understand the data being presented in the figure or table.

VII. Discussion/Further Experiments

- A. It is not a requirement that experiments work or yield a publishable result. It is important to analyze the experiments, and particularly in the case where few results were obtained, to suggest further experiments that might shed light on the problem. Interpret your results, and relate them to the original purpose of the project.
- B. Compare your results with observations of others (bring in relevant literature); explain/reconcile differences.
- C. Mention sources of error, problems and rationalizations.
- D. Point out the relevance and implications of this study.
- E. Suggest next steps for future studies.
- F. The Discussion section and Further Experiments sections combined should be a minimum of 2000 words.

VIII. General Points:

- A. The Introduction and Discussion sections should demonstrate a knowledge of the larger field, and represent a mini-review of the topic of the paper.
- B. The "Experimental Design section and the "Further Experiments" section are important in demonstrating the student's understanding of the experimental system.
- C. The thesis must have been read and signed by the thesis sponsor prior to turning it in to the department.
- D. All signed theses must be turned in to the MCDB Student Affairs Office by the deadline detailed in the course information packet.
- E. The thesis must carry the recommendation of the thesis sponsor and receive final approval from the Undergraduate Honors Committee in order to be awarded Departmental Honors, or Highest Honors.
- F. Please feel free to make an appointment to discuss your honors thesis with Dr. Steve Jacobsen, Undergraduate Honors Advisor at any point in your progression through the Honors Program.