



The Department  
of  
Biological Sciences

Departmental Honors Program  
Handbook

2022 – 2023



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**University of Mary Washington**  
**Department of Biological Sciences**  
**Honors Program Overview**

Whether a student becomes a teacher, a hospital administrator, a physician, a laboratory technician, or a basic scientist, the undergraduate scientific research experience offers benefits to the student that go well beyond that of traditional coursework. By focusing on an original scientific question or problem, the scientific research experience promotes creative and analytical thinking, and because the ultimate goal of a research project is to uncover new information, the research process helps students better understand how to ask scientific questions, how to recognize scientific problems and how to develop new scientific ideas. The scientific research process requires students to apply their understanding of the natural world and integrate complex but interrelated information, promoting a better understanding of the complex way in which the natural world works. Thus, undergraduate research is an integral part of the curriculum of The Department of Biological Sciences at the University of Mary Washington.

Undergraduate research in the Department of Biological Sciences happens in several contexts. While most courses in the Department's curriculum incorporate elements of the research process, such as creating hypotheses, making predictions, collecting data and drawing conclusions, into student assignments, several courses are designed specifically to engage students in research work. URES197, Undergraduate Research, is a course in which students complete basic research tasks usually connected to a faculty member's research work. All Biology students are required to take a course designated as RI (Research Intensive), and there are several courses offered in each semester with this designation. However, interested students can undertake more-advanced independent research projects under the supervision of a department faculty member by enrolling in BIOL491, Special Problems in Biology. In addition to these courses, select students can engage in summer research projects as part of the Summer Science Institute, a 10-week summertime research experience involving Biological Sciences, Chemistry, Physics, Environmental and Earth Science, Mathematics, and Computer Science.

The most challenging and potentially most rewarding research opportunity in the Department of Biological Sciences is the Honors Program. The Departmental Honors Program is designed to lead the undergraduate researcher through a true, complete research project, from the development of an original research question and the drafting of a formal research proposal, through the collection and analysis of data, to drawing formal conclusions that add new knowledge to our understanding of the biological world. The Honors student is required to write a formal thesis, a bound copy of which is placed in the library's collection, and deliver an oral presentation to department faculty and other interested parties.

A student interested in participating in the Honors program should consider the program's eligibility and acceptance criteria and understand the requirements of the program (see below). They need to seek out a department faculty member who would be interested in taking them on as an Honors research student. Then, they must enroll in BIOL481, Readings in the Biological Sciences, a course designed to introduce the student to the research topic and through which the student, in consultation with and guidance by that faculty member, will develop an original research question and design a viable research project.

Like the professional scientist, prospective Honors students must consider some very practical issues when developing a viable research project. For example, is the scope of the project appropriate for the expertise of your prospective mentor and the time available for research? Is the cost of doing the project reasonable? Are the tools and equipment required to complete the project available? Can the research work and thesis writing be completed within the Honors research timeline? Can the student commit the time and effort needed to complete the project?

The requirements for Honors research are stringent and the work-load is demanding. Your research project should essentially take the place of a 4 credit class each semester and will require AT LEAST as much effort as you have put into your most difficult class. Students who seek out this level of undergraduate education are usually those that look forward to the challenges and are exhilarated by the experience. In the final outcome, those who complete the program, no matter what their future profession, attain a level of understanding of the biological world, develop a set of research skills and experience a sense of satisfaction beyond that typically gained from non-Honors research.

Please note that students often underestimate the work load required to carry out an Honors research project. You may find that you need to spend part of the winter or spring break staying at UMW to work on your research. You may find that you do not have time to be involved in both athletics and Honors research, or to be involved in clubs and Honors research. What you choose to do with your time is up to you, but be advised that Honors research takes more time than many think it will.

### ***Learning Objectives***

1. To develop a unique research question based upon a comprehensive literature review.
2. To design a research project to answer the unique research question.
3. To master discipline-specific techniques required for the research project.
4. To complete the independent research project.
5. To disseminate the results of the independent research project both orally and in a written thesis document.

## **Honors Research Program Details**

### **Student Eligibility**

- Eligible students
  - Must be a junior-level biology major.
    - Transfer student eligibility will be decided on a case by case basis
    - Students who have selected biology as a minor are NOT eligible.
    - Students who have a special major and whose research advisor is a member of the biology faculty ARE eligible.
  - Must have a 3.00 overall UMW cumulative GPA and a 3.25 cumulative GPA in the Biology Major at the time of application.
    - A student must also meet these GPA requirements at graduation.
    - GPA calculations do not include BIOL481 and BIOL491.
    - The GPA of transfer students will be examined at the time the transfer student's eligibility is taken up by the Department faculty.
  - Must have satisfactorily completed BIOL481
    - Students co-enrolled in BIOL481 and BIOL491 in the first semester of their senior year are eligible as long as they submit the Honors Program Application and an Honors Research Proposal by the deadline specified below.

### **Application Procedures**

- Eligible students apply by submitting the following documents to the Departmental Honors Program committee chair
  - Honors Program Application Form (Appendix E)
  - One paper copy of the Honors Research Proposal with content and form as outlined in Appendix B.
  - An electronic copy of the Honors Research Proposal
- Due Dates by semester
  - Fall semester – August 26<sup>th</sup>
  - Spring semester – January 13<sup>th</sup>
  - Summer semester – May 15<sup>th</sup>

## **The Departmental Honors Program Committee**

The charge of the Departmental Honors Program Committee is

- To oversee the Honors Program in the Biological Sciences.
- To Review Departmental Honors proposals submitted to the program.
- To periodically review and evaluate the Departmental Honors Program.
  
- The Departmental Honors Program Committee will have four members
  - Two of which should be tenured faculty.
  - Membership will be open to all full time tenure track faculty.
  - Each member serves a 4-year term.
  - The Chair will be the most senior member of the committee and will rotate off the committee after serving as chair.
  - Members will rotate so that the committee gains one new member each year.
    - A member of the committee whose own student has submitted an Honors proposal will be excluded from discussions and decisions regarding that Honors research proposal.
  
- The Departmental Honors Program Committee will meet and review all Honors Proposals with three possible outcomes of review:
  - Accepted.
    - The student meets all eligibility requirements and the proposal is deemed satisfactory.
  - Provisional Acceptance.
    - The student meets all eligibility requirements but revisions need to be made to the proposal
    - The student is accepted into the Honors program and Honors research could begin immediately, but the student needs to submit a revised proposal within 4 weeks or lose Honors status.
  - Rejected. An Honors request can be rejected for any of the following reasons.
    - The student does not meet all eligibility requirements.
    - The project does not have a reasonable chance of being completed before the student's anticipated graduation date.
    - The proposal for research does not and cannot meet the expectation for Honors Biology research.
    - Any rejected proposal will be returned with significant comments. If it is possible for a student to satisfactorily address these comments, a new proposal can be submitted after consultation with the Departmental Honors Program Committee Chair.

- The Work of the Departmental Honors Program Committee Chair:
  - Verify application GPA calculations.
  - Initiate proposal reviews.
  - Convene the committee.
  - Notify the student and research mentor of the committee decision prior to the first day of classes in the upcoming semester.
  - Notify the student and research mentor of the final acceptance if revisions were required.
  - Compile an electronic folder the graduation year in which you are chair. For each student graduating the year you are chair (even if they did not complete Honors), the folder should include:
    - research application
    - the final accepted research proposal
    - the final Honors thesis if student completed Honors
  - The electronic files should be stored on the Biology Shared Drive under Honors Documents
  - Pass a folder to the next Honors Proposal Committee Chair for each student not graduating the year you are chair. This folder should include:
    - Research application
    - The final accepted research proposal
    - Any checkpoint reports if student is continuing in the Honors program
  - Schedule Honors Defenses.

## **The Research Review Committee**

The charge of the Research Review Committee is

- To monitor research progress.
- To ensure the research project maintains the standards required for Departmental Honors.
  
- Upon acceptance into the Honors Program, a research review committee for each student will be formed.
  
- The committee will consist of three members
  - The research mentor will serve as chair
  - Two additional members will be determined by consultation between the research advisor, the student, and faculty members
  - In the case of interdisciplinary or collaborative research, more members will be added
  
- Work of the research mentor
  - To report the members of the Research Review Committee to the Departmental Honors Program Committee chair by the end of the second week of classes in the term in which the Honors proposal was accepted.
  - To oversee the week - to - week progress of the student in terms of the research project and thesis preparation.
  - To submit checkpoint reports that have been approved by the Research Review Committee to the Departmental Honors Program Committee Chair.
  
- Work of the committee
  - The research committee will meet with the student at regularly scheduled checkpoints to review the student's progress. The details of these checkpoints are in the next section of the handbook
  - To oversee thesis writing
    - based on a timeline agreed to by the research review committee at the second checkpoint
    - any deviations from the schedule set should be clearly communicated to and approved by the research review committee
    - any problems should be reported to the Departmental Honors Program Committee chair.
  - To approve the Honors Defense
  - To approve and sign the final Honors Thesis

## **Research Checkpoints**

Dates for checkpoints are based on a two semester project that would be completed in the spring of the student's senior year. If the student is conducting research for 3 or more semesters, or the student is not graduating in the spring, the student is responsible for determining a checkpoint schedule that includes all of the components listed below. This schedule should be discussed at the first checkpoint and reported to the Departmental Honors Program Committee Chair as part of the first checkpoint report. If the project is 3 or more semesters the committee can request additional checkpoints.

- Checkpoint 1 – Last Friday in September
  - After forming the research review committee, the student should
    - Email the committee a copy of the research proposal
    - Arrange a meeting with the committee to review the proposal and propose a timeline for the completion of the project goals.
  - One committee member should record discussions, committee advice, and any requirements of the committee for the student.
  - This record should be approved by the committee members and forwarded to the Departmental Honors Program Committee chair by the research mentor.
  
- Checkpoint 2 – Last day of classes in the Fall semester
  - Student should create a presentation that informs the committee of current progress on his / her project to date and a timeline for the work to be completed by the second checkpoint.
  - The kinds of questions each Honors researcher should expect to answer are:
    - Is the method working?
    - Do you have the required research materials?
    - Are there external constraints slowing your progress?
    - Has your schedule allowed you to spend as much time on this project as you had planned?
  - One committee member should record discussions of research progress, committee advice, and any requirements of the committee for the student.
  - This record should be approved by the committee members and forwarded to the Departmental Honors Program Committee chair by the research mentor.
  
- Checkpoint 3 – Friday following Spring Break
  - The student should have completed all of his / her research and have some written material for review.
  - The student should create a presentation that updates the committee and includes a timeline for the work that remains.
  - One committee member should record discussions of research progress, committee advice, and any requirements of the committee for the student.
  - This record should be approved by the committee members and forwarded to the Departmental Honors Program Committee chair by the research mentor.

### **Honors Defense**

- The Honors defense will be held on or before the next to last day of finals of the semester in which the student graduates.
- The student and research mentor, in consultation with all members of the Research Review Committee and the Departmental Honors Program Committee Chair, will set the date and time for the defense and inform the proposal committee chair.
- The defense must be scheduled by the 2<sup>nd</sup> Friday of April.
- Funds may be available if student would like to arrange for snacks and drinks. The student can check with the department chair.

### **Honors Thesis**

- Each Honors student must submit a copy of his / her thesis that follows the guidelines and style requirements in Appendix C.
- The deadline for notifying the Office of Student Records of recipients of Departmental Honors is the last day of exams of the semester in which the student graduates.
- The student's adviser shall notify the department chairperson of the research review committee's decision in time that a letter can be written to the Office of Student Records.
- The student must prepare 2 copies of his / her final thesis with original signatures on each copy and submit these copies to the department chair by the last day of final exams.
- In the recent past, the department has also bound a thesis copy for the student and the thesis advisor. The thesis advisor should communicate with the department chair to make these arrangements and provide additional copies of the thesis for this purpose.

### **Honors Program Completion**

Upon completion of all the requirements for Departmental Honors in Biology,

- The Departmental Honors Program Committee chair will calculate the student's average and major GPAs to verify they are above 3.0 and 3.25, respectively.
- The department chair will notify the Office of Student Records that the student meets all requirements for Departmental Honors.
- The department chair will arrange to prepare copies of the Honors Thesis and send a copy to the library.

## Summary of Due Dates

### **Application Deadlines:**

- Fall semester – August 26<sup>th</sup>
- Spring semester – January 13<sup>st</sup>
- Summer semester – May 15<sup>th</sup>

### **Report Research Review Committee members**

- end of week 2 of the Fall semester in the student's senior year.

### **Submit any required revisions to the Honors research proposal**

- within 4 weeks of Honors committee's decision.

### **Check point 1.**

- Last Friday of September.

### **Check point 2.**

- end of the last day of classes in the fall semester.

### **Check point 3.**

- Friday following spring break.

### **According to Schedule set at Checkpoint 3**

- Submit first draft of thesis to Research Review Committee
- Submit revised draft of thesis to Research Review Committee
- The revised draft *must* be submitted to the Research Review Committee no later than 24 hours prior to the defense.

### **Schedule Thesis defense**

- 2<sup>nd</sup> Friday of April.

### **Thesis defense date**

- no later than 24 hours prior to the end of the last day of exams.

### **Submit final copy of thesis**

- 24 hours prior to the last day of exams.

### **Submit 4 copies of final thesis**

- last day of exams.

## **Honors Research Proposal Content and Form**

### **Form**

For Proposal Form, please refer to:

- Typing and General Style sections of the Honors Thesis (Appendix C, Page 16)
- In Text and Literature Cited section of the Honors Thesis (Appendix C, Page 19)

### **Title Page**

The title page should be structured according to the following text:

Honors Research Proposal

Title of Project

By

Student Name

Faculty Supervisor: Dr. Faculty Name

University of Mary Washington

Fredericksburg, VA

### **Section 1: Statement of Problem or Hypothesis and Specific Objectives**

The research idea expressed in the proposal must be well thought-out and stated in the form of a problem or issue to be addressed, a question to be answered or an hypothesis to be tested. Methods projects, i.e., projects designed to develop a workable scientific protocol or procedure, are acceptable, as long as the research idea is stated as described here. This section should be short. It should contain a brief statement that puts the problem in context of its importance or significance and a brief statement of the problem to be answered or the hypothesis to be tested.

The specific objectives must be clearly stated, must be unique to the project and must stand on their own, i.e., they must not depend on the work of others to be completed. Be sure to explicitly state what is unique about the proposed research.

### **Section 2: Literature-based Rationale**

A sensible, clearly-written rationale, based on previous work reported in the literature, must be used to support the specific objectives of the proposal. If previous work has been done on your project by other researchers in your research mentor's laboratory, you should describe that work and clearly explain where that work ends and your work begins. Cite a former thesis or unpublished data as appropriate. If section 1 does not explicitly state a hypothesis, the rationale must describe the reasoning leading to expected results or predictions.

### **Section 3: Experimental Design and Analysis**

A concise description of the experimental design of the experiment, including a description of experimental groups, controls, numbers of replicate samples, etc. must be included here. Include a statement of the statistical analyses to be performed and why these analyses are appropriate. Experimental design and analysis must clearly answer the question described by the author and it must conform to the standards of scientific method appropriate for the field of study. Experimental design should restate the measurable variables with their units. Experimental design should NOT include a step-by-step explanation of protocols. Experimental design should include a timeline for each protocol listed (so you must determine how much time you believe each protocol will require). If you have already begun work on your project, you should clearly indicate what portions of the experimental design have been completed or are in progress. This information will help the Honors Program Committee determine if there is sufficient time to complete the project.

### **Section 4: Expected Results or Predictions**

Specific objectives will always suggest a specific set of measurable results. A hypothesis driven project will always generate a measurable prediction or predictions. Expected results or predictions must be included in order to judge a student's ability to reach his / her objectives. In each prediction you state, be sure to identify the specific variables and units you will use to measure your results.

## Appendix B

### **Section 5: Literature Cited**

The literature cited style must conform to the Scientific Style and Format: The CSE Manual for Authors, Editors, and Publishers (most recent edition). There are examples of the citation style in Appendix C on page 19.

### **Section 6: Budget**

Expenses for the research project should be included. A copy of the budget sent to the Dean for Undergraduate Research Grants would be sufficient.

## **Honors Research Thesis Content and Form**

Your Honors advisor may have specific requirements for your thesis. The following are Departmental guidelines.

### **THESIS CONTENT**

A scientific report usually consists of the following:

- Title
- Biography
- Abstract
- Introduction
- Materials and Methods
- Results
- Discussion
- Acknowledgments
- End References or Literature Cited

#### **Title**

The title should reflect the factual content of the paper. Scientific titles are not designed to catch the reader's fancy. A good title is straightforward and uses key words from the paper.

#### **Biography**

The biography should include pertinent information regarding the student's date and place of birth, institutions attended, degree and Honors received.

#### **Abstract**

The purpose of an abstract is to allow the reader to judge whether it would serve his or her purposes to read the entire report. A good abstract is a concise (100 to 250 words) summary of the purpose of the report, the data presented, and the author's major results and conclusions. The abstract should not contain images or reference citations.

#### **Introduction**

The introduction defines the subject of the report. It must outline the scientific purpose(s) or objective(s) for the research performed and give the reader sufficient background to understand the rest of the report and what has been done previously. Care should be taken to limit the background to whatever is pertinent to the experiment. A good introduction will answer several questions, including the following:

- Why was this study performed? Answers to this question may be derived from observations of nature or from the literature.
- What knowledge already exists about this subject? The answer to this question must review the literature, showing the historical development of an idea and including the confirmations, conflicts, and gaps in existing knowledge.
- What is the specific purpose of the study?

## Appendix C

- How is this study different from past studies?
- The specific hypotheses should be described.

### **Materials and Methods**

As the name implies, the materials and methods used in the experiments should be reported in this section. The difficulty in writing this section is to provide enough detail for the reader to understand the experiment without overwhelming him or her. When procedures from a lab book or another report are followed exactly, simply cite the work, noting that details can be found in that particular source. Materials used in the study should be described in the text of this section and not presented in a list. However, it is still necessary to describe special pieces of equipment and the general theory of the assays used. This can usually be done in a short paragraph, possibly along with a drawing of the experimental apparatus. Generally, this section attempts to answer the following questions:

- What materials were used?
- How were they used?
- Where and when was the work done? (This question is most important in field studies.)

### **Results**

The results section should summarize the data from the experiments without discussing their implications. The data should be organized into tables, figures, graphs, photographs, and so on. But data included in a table should not be duplicated in a figure.

This section of your report should enable the reader to develop an appreciation of the general trends in your data and the degree of variability in your results. Concentrate on general trends and differences and not on trivial details. Many authors organize and write the results section before the rest of the report.

### **Discussion**

In the discussion section, the data collected are interpreted in relation to the hypotheses or purposes proposed in the introduction. Your findings should be related to existing knowledge on the topic. You should also be able to suggest future experiments that might clarify areas of doubt in your results.

This section should not just be a restatement of the results, but should stress interpretation of the data, relating it to existing theory and knowledge. Speculation is appropriate if it is so identified. Suggestions for the improvement of techniques or experimental design may also be included here. In writing this section, you should explain the logic that allows you to accept or reject your original hypotheses.

### **Acknowledgments**

In this section, the writer gives credit for special assistance received from other sources. Stating specifically what assistance was provided (e.g. someone who ran statistical analysis, someone who injected animals, etc.).

### **End References or Literature Cited**

All references must be properly cited in the paper. When information belongs to others, they must be given proper credit. Failure to do so is plagiarism.

The literature cited is a list of all books, publications, and communications from which significant materials were cited in the paper.

- The listing is alphabetical by the last name of the first author of a citation.
- In general web site sources as literature citations are unacceptable. Computer sources should be archived (files, databases, books, etc. which are available for inspection but are put on-line for easy access and convenience) or refereed on-line journals.
- Format for in-text and literature citations can be found in Appendix D.

## **THESIS FORM**

The following presents a style guide for the preparation of the Honors Thesis. These guidelines are to be strictly followed.

### **Sequence of manuscript and page numbering:**

Title Page – See sample. In the thesis, this page is not numbered.

Second Page - See sample. This page is for approval signatures of the Honors Committee members. It should be numbered "ii".

Third Page - For the curriculum vitae, this page should include biography of the student. It should be numbered "iii".

Fourth Page - Acknowledgement(s). This page should be numbered "iv".

Fifth Page - The Abstract. This page should be numbered "v".

Sixth Page - Table of Contents. It should be numbered "vi".

Thesis Proper - Arabic numbers are to be given to all pages including illustrations.

Literature Cited – Should begin on a separate page. The pagination should follow that of the thesis proper.

Appendices – Should begin on a separate page. The pagination should follow that of the literature cited.

## Typing

- Use double-spacing throughout all text. Single spacing may be used in tables, figure captions and each reference citation (double space between individual citations). Print on one side only of 8 1/2 × 11-inch white paper.
- Use 12 point Times New Roman font.
- Use 14 point Times New Roman font for the title and section headings.
- Margins shall be not less than 1 inch (2.5 cm) on top, right, and bottom sides and 1.25 inches on the left side of all pages **INCLUDING** appendices.

## General style

- All scientific names (*Genus* and *species*) must be italicized (e.g. *Aeschynomene virginica*).
- Use the metric system of measurements.
- Be aware that the word *data* is plural while *datum* is singular. This affects the choice of a correct verb. The word "species" is used both as a singular and as a plural.
- Numbers should be written as numerals when they are greater than ten or when they are associated with measurements; for example, 6 mm or 2 g, but *two* explanations or *six* factors. When a list includes numbers over and under ten, all numbers in the list may be expressed as numerals; for example, 17 sunfish, 13 bass, and 2 trout. Never start a sentence with numerals. Spell out all numbers that begin sentences.
- Be sure to divide paragraphs correctly and to use starting or ending sentences that indicate the purpose of the paragraph. A report or a section of a report should not be one long paragraph.
- Every sentence must have a subject and a verb.
- Avoid the use of slang and the overuse of contractions.
- Be consistent in the use of tense throughout a paragraph--do not switch between past and present.
- Be sure that pronouns refer to antecedents. For example, in the statement "Sometimes *Cecropia* caterpillars are in cherry trees but they are hard to find," does "they" refer to caterpillars or trees?
- After writing a report, read it over, watching especially for lack of precision, in your results and ambiguity, in general. Each sentence should present a clear message. The following examples illustrate lack of precision:
  - "There may have been an error in our temperature measurements."
  - "The sample was incubated in mixture A minus B plus C." Does the mixture lack both B and C or lack B and contain C?
  - The title "Protection against Carcinogenesis by Antioxidants" leaves the reader wondering whether antioxidants protect from or cause cancer.
  - "The vole population was relatively large in the field near the preserve."  
"Relative" statements must always include a clear comparison. For example, "the vole population in the field near the preserve was large relative to the average population size of all fields."
- The only way to prevent such errors is to read and think about what you write. Learn to reread and edit your work.

### **Symbols, acronyms, spelling and measurement**

- Define all symbols and spell out all acronyms the first time they are used.
- All weights and measures must be in the metric system, SI units. Abbreviations may be used for units of weight or measurement that describe data.
- Consult *Scientific Style and Format: the CSE Manual for Authors, Editors, and Publishers* (2006) for conventions and examples of table style, abbreviations, symbols, etc. For spelling, consult *The American Heritage Dictionary of the English Language* (Soukhanov 1992 or more recent).

### **Figures**

- “Figures” refers to graphs, maps, illustrations, original art, drawings, or pictorial models.
- All figures **should be able to stand alone**, i.e., figures have a descriptive title, caption, and legend explaining any symbols, abbreviations, or special methods used. The title and caption belong below the figure.
- Figures should be numbered separately and should be referred to in the text by number. The numbers should be in order as they appear in the text. For example, do not refer to Figure 2 before you refer to Figure 1. Note that when referring to a figure the word or “Figure” is capitalized.
- If tables or figures are printed in Landscape mode the bottom of the table (figure) should be to the right side of the page (binding is on the left side).
- Black-and-white figures, photographs, maps, line drawings, and graphs must be high quality, camera-ready, black-and-white prints, photostats, or original art. If submitted as a file, the resolution must be 300 dpi or greater. When labeling figures, make sure to use large enough letters so that they will be no smaller than 12 points. In drawings and graphs, capitalize only the first letter of the first word of each label; use a typeface without bold or italics (unless genus, species, or generic names).
- All figures and images must be within the typing area of the paper. They may be any size, but under no circumstances may they extend into the margin.
- Generally a graph is superior to a table when you are more concerned about the “shape” of the data, for example, how concentration of glucose in the bloodstream changes over time.
- By convention the independent variable belongs on the X-axis.
- Remember the data you graph may be subject to more than one interpretation. You can bring out, hide, exaggerate, or misrepresent the message carried by a given set of data by the way you choose to draw the graph.

**Tables**

- Do not use a table for a small amount of data that can be easily listed in the text.
- The table title and caption should allow the table to stand by itself without additional explanation. The title and caption belongs at the top of the table.
- Each column must have a descriptive heading. Lower case letters should be used to indicate table footnotes.
- Tables generally do not include vertical lines or horizontal lines other than the lines setting off the column headings from the body of the table and the line at the end of the table (note example below).
- Numbers in columns are properly aligned (note last two columns below).

Table 3. Growth rate of cell cultures and activity of ornithine decarboxylase (ODC) and succinate dehydrogenase (SDH) in *Pseudomonas aeruginosa* in response to various carbon sources.

Carbon source	Growth rate (generations/h)	Enzyme activity	
		ODC ( $\mu\text{mol CO}_2/\text{h}$ )	SDH (mmol fumarate/h)
Glucose	0.93	12.6	137.7
Sucrose	0.21	6.9	19.3
Mannitol	0.47	1.5	50.9

### **In-text citations**

#### **Follow the citation style of CellPress.**

#### **Basically:**

- In-text citations take the form: (Author, date). For example:
  - Fox (1978) investigated the effects of hormones on the nest-building behavior of catbirds.
  - Hormones are known to influence the nest-building behavior of catbirds (Fox, 1978).
- Multiple citations should be listed by year of publication, earliest first: (Author, date; Author date).
- Use the first author's name and "*et al.*" for in-text citation of works with more than two authors or editors (Author *et al.*, date); list every author or editor in the "End References" list unless there are more than 10 authors.
- All works cited in the text must be listed alphabetically by the last name of the first author in End References; works not cited must not be listed.
- Provide the full names of all journals, do not abbreviate.

#### **End References or Literature Cited**

The literature cited style must conform to the Scientific Style and Format: The CSE Manual for Authors, Editors, and Publishers (most recent edition). Note that each reference is single spaced, indented on any additional lines after the first line, and there is a double space between references. Some common examples are shown below:

**Personal communications, unpublished data, and manuscripts in preparation** should be cited in the text. The citation should include the source's name and affiliation in the following form: (Henry J. Smurd, university or other affiliation, city, state, personal communication). Letters should be available from authors of personal communications giving permission to cite the unpublished data.

#### **Journal article:**

Capitalize the first word, but not the remainder of the titles of journal articles (except for proper names).

McCaffrey, A. and R. D. Dueser. 1990. Plant associations of the Virginia barrier islands. Virginia Journal of Science 41:282-299.

Bryant, P. J. and P. Simpson. 1984. Intrinsic and extrinsic control of growth in developing organs. Quarterly Review of Biology 59:387- 415.

#### **Book:** (book titles are in capitals)

Spry, A. 1969. Metamorphic Textures. Pergamon Press, New York. 350pp.

## Appendix C

### **Chapter in book**

Capitalize the first word, but not the remainder of the chapter titles (except for proper and scientific names).

Southwood, T. R. E. 1981. Bionomic strategies and population parameters. Pages 30-52 *In* May, R. M., ed. *Theoretical Ecology*. Sunderland (MA): Sinauer Associates.

### **Technical report**

Lassister, R. R. and J. L. Cooley. 1985. Prediction of ecological effects of toxic chemicals, overall strategy and theoretical basis for the ecosystem model. Washington (DC): Government Printing Office. Report no. 83-261-685. Available from: National Technical Information Service, Springfield, VA.

### **Meeting paper**

Kleiman, R. L. P., R. S. Hedin and H. M. Edenbom. 1991. Biological treatment of minewater--an overview. Paper presented at the Second International Conference on Abatement of Acid Drainage. 16-18 Sep 1991. Montreal, Canada.

### **Dissertations and Theses:**

note distinction between dissertation & master's thesis

Cocoran, M. F. 1981. Geographic variation and evolutionary relationships of two species of bullhead catfishes (Siluriformes: Ictaluridae) in the Southeastern United States [dissertation]. [Durham (NC)]: Duke University.

Oviedo, S. 1995. Adolescent pregnancy: voices heard in the everyday lives of pregnant teenagers [master's thesis]. [Denton (TX)]: university of North Texas.

### **Online article**

**Note:** This type of citation should be extremely rare. Most journal articles online are published articles that you are accessing online. They have citations that fall under the above categories. This section is only for online webpages. You should consult your research mentor before using this type of resource.

If the article is 'in press', please include the DOI with the journal citation.

Grissino-Mayer, H. D. 1997. Ultimate Web pages about tree rings and tree-ring research. <<http://www.valdosta.edu/~grissino>> (4 November 1997).

Stærkeby, M. 2000. Introduction to forensic entomology <[http://www.uio.no/~mostarke/forens\\_ent/introduction.shtml](http://www.uio.no/~mostarke/forens_ent/introduction.shtml)> (21 August 2000)

Appendix D

**SAMPLE OF THESIS TITLE PAGE:**

TITLE

by

name in full

Thesis

Submitted in partial fulfillment of the requirements for Honors in Biology at the University of  
Mary Washington

Fredericksburg, Virginia

Date

Appendix D

**SAMPLE OF SECOND PAGE - SIGNATURE PAGE:**

This Thesis by (type name in full) is accepted in its present form as satisfying the thesis requirement for Honors in Biology.

Date:

\_\_\_\_\_

Approved:

signature  
type advisor name  
(Chairman of Honors Committee)

\_\_\_\_\_

signature  
type committee member name  
(Title)

\_\_\_\_\_

signature  
type committee member name  
(Title)



**CHECKLIST FOR DEPARTMENTAL HONORS**  
**DEPARTMENT OF BIOLOGICAL SCIENCES**  
(highlighted words indicate links to detailed descriptions)

**Date**

**Completed**

**Requirement**

_____	Satisfactory completion of Biol 481
_____	Eligible students submit application and proposal for Honors to the Departmental Honors Program Committee Chair no later than 5pm on the following dates. <ul style="list-style-type: none"><li>• Fall semester – August 26<sup>th</sup></li><li>• Spring semester – January 13<sup>th</sup></li><li>• Summer semester – May 15<sup>th</sup></li></ul>
_____	At least 2 semesters of BIOL491 (independent research)
_____	Report Research Review Committee members to the Departmental Honors Program Committee Chair by the end of the first two weeks of the student's senior year.
_____	Submit any required revisions to the Honors research proposal to the Departmental Honors Program Committee Chair within the first 4 weeks of committee decision.
_____	Check point 1. Overview of proposed project and timeline for work to be completed in the fall semester. Must be completed by the last Friday of September.
_____	Check point 2. First semester progress review and timeline for work to be completed in the first half of spring semester. Must be completed by the end of the last day of classes in the fall semester.
_____	Check point 3. Second semester progress review and timeline for completing the written thesis. Must be completed by the Friday following spring break.
_____	Submit first draft of thesis to Research Review Committee according to timeline established at check point 3.
_____	Submit revised draft of thesis to Research Review Committee according to timeline established at check point 3. The revised draft <i>must</i> be submitted to the Research Review Committee no later than 24 hours prior to the defense.
_____	Schedule Thesis defense through the Departmental Honors Program Committee Chair by the 2 <sup>nd</sup> Friday of April.

## Appendix E

\_\_\_\_\_

Thesis defense date no later than 24 hours prior to the end of the last day of exams.

\_\_\_\_\_

Submit final copy of thesis to Research Review Committee for signatures 24 hours prior to the last day of exams.

\_\_\_\_\_

4 copies of final thesis to the Departmental Honors Program Committee Chair by last day of exams.