

Dickinson College
Department of Mathematics and Computer Science

Requirements for Departmental Honors

Departmental honors is the highest distinction that the Department can award to a major. Majors who receive departmental honors will be those who demonstrate a broad mastery of the discipline as well as an ability to complete and present high quality research. A broad mastery of the discipline is demonstrated by a GPA of 3.40 or higher in all courses related to the major. The ability to complete high quality research is demonstrated by the completion of a yearlong research project. This project will be characterized by an independent and in-depth study of an advanced topic including a literature search, reading of original sources and a novel formulation of results. Finally, the ability to present such research is demonstrated by the preparation of a thesis, a public presentation and a successful defense of the work to the department faculty.

Getting Started:

If you are a major interested in pursuing departmental honors you should study this document carefully and begin talking to the faculty about possible research areas no later than spring break of your junior year. To be eligible to pursue departmental honors, you should identify both a research area and a thesis advisor by the end of your junior year. You will then be expected, under the direction of your thesis advisor, to complete all of the necessary of the requirements for honors (see Requirements below).

As you begin to think about research areas, keep in mind that not every faculty member is an expert in every research area. Thus, there is no guarantee that a particular faculty member will be willing or even able to advise research in your area of interest. It is also possible that there is no faculty member who is willing or able to advise research in some areas. However, most faculty have a variety of interests and if you are flexible it is likely that you will be able to find an area of common interest a faculty member. That said, there are many more students than there are faculty and in rare cases it is possible that not every student wishing to pursue departmental honors will be able to find a faculty member willing to advise a project. In such situations, faculty will work with you to identify alternative ways to gain similar experiences that move you toward your goals.

Requirements:

As described above, to receive departmental honors you must maintain a GPA of 3.40 in the major and must complete a yearlong research project ultimately resulting in a thesis, a public presentation and a successful defense. Each of these requirements as well as a number of intermediate requirements and the criteria for their evaluation are discussed in more detail below.

The Grade Point Average:

If you wish to pursue departmental honors you must, at the end of your junior year, have a GPA of at least 3.40 in all courses related to the major. In addition, to actually receive departmental honors you must graduate with a GPA of at least 3.40 in all courses related to the major. Under

exceptional circumstances a major may petition the department for permission to pursue honors with a GPA below 3.40 in all courses related to the major. Such a petition must provide rationale and establish a minimum GPA for the exception. In such cases, a majority vote of all full-time permanent faculty is required to approve the petition.

The Research:

To receive departmental honors you must complete a yearlong research project under the direction of a faculty advisor. The role of your faculty advisor will help you to precisely define the research project to be undertaken and then guide and monitor your progress. Students pursuing honors work independently, but typically meet with their advisor at least once a week. At a minimum the project must ask a question of interest to the academic community, include a survey of the relevant literature search, and develop and present a novel formulation of results. This is not intended to imply that the generation of novel results is required. However, projects that merely survey the existing literature or implement large application programs are not generally considered appropriate for departmental honors.

The actual work associated with your research project will begin with background reading and preparation during the summer before your senior year and will continue throughout your senior year. In Mathematics students may, with the approval of their thesis advisor, take an independent research credit associated with their honors project each semester. In Computer Science the honors project will be completed as the capstone project in the senior seminar. In exceptional cases additional research credits may be approved by the thesis advisor, up to the limits imposed by College policy (see the Academic Bulletin).

The Statement of Intent to Pursue Departmental Honors:

The Statement of Intent to Pursue Departmental Honors form is available on the Department's web page. This form serves to inform all of the department faculty of your intention to pursue departmental honors. It identifies you and your faculty advisor and it gives a tentative title and short description of the project. It also gives a list of citations for a summer reading list that you will complete between your junior and senior years to establish the required background knowledge to begin the project. Note that it is not necessary to pose the specific research question that will be addressed at this time. This form is submitted to your thesis advisor who distributes it to the entire department. It provides an early opportunity for the department faculty to provide feedback, offer suggestions or to express concerns about the suitability of a project for Departmental Honors.

The Formal Research Proposal:

The Formal Research Proposal poses the specific research question that will be investigated, surveys the relevant literature to place the question in context and describes how the research will be performed. The Formal Research Proposal should be formatted according to the Thesis Style Guide, available on the Department's web page. The front matter (title, index, abstract, etc.) may be omitted for the Formal Research Proposal.

The Formal Research Proposal is submitted to the thesis advisor who will circulate it to the entire department. It serves to provide the faculty with the opportunity to assess whether the proposed work is suitable for the pursuit of departmental honors. The faculty may also use this opportunity to provide suggestions and early feedback on the direction, scope and/or methods of the proposed research.

The Thesis Committee:

Your thesis committee will be constituted by your thesis advisor and at least two additional members. Typically, these two members will be other faculty from the College who have knowledge of and interest in your research area. However, with the approval of your thesis advisor, one member of your committee may be someone from outside the College who is able to assess your work. Outside committee members are required to provide feedback on your written artifacts and to attend your public presentation and defense.

The Research Report:

The Research Report is submitted at the end of the first semester. It is a complete accounting of the progress to date. The research report builds upon the Formal Research Proposal. It poses the specific research question that is being investigated and surveys the relevant literature to place the question in context. It then goes on to describe what has been accomplished thus far and presents any preliminary results that have been obtained. The Research Report concludes by discussing the work that remains to be completed. The Research Report should be formatted according to the Thesis Style Guide, available on the Department's web page. The front matter (title, index, abstract, etc.) may be omitted for the Research Report.

This document will be submitted to the thesis advisor and to the thesis committee. It will serve to update the thesis committee on the progress that has been made. It also provides the thesis committee with an opportunity to give feedback on the pace of the work as well as the quality of both the research and the writing.

The Honors Thesis:

The Honors Thesis describes the entirety of the research performed. The Honors Thesis builds upon the earlier Research Report. It states the specific research question that was investigated and surveys the relevant literature to place the question in context. In addition, the Honors Thesis fully describes the work that was performed, summarizes and analyzes the results, draws conclusions, discusses the limitations of the work and how the limitations might be addressed by further work. The Honors Thesis must be formatted according to the Thesis Style Guide, available on the Department's web page and must include all front matter.

The Honors Thesis is the primary source of information that will be used by the thesis committee in its determination of whether to recommend to the department that the candidate be awarded departmental honors. Your advisor and committee will evaluate your thesis based on the following criteria:

- The precision with which it identifies the research question being investigated.
- The motivation of the research and grounding of it in the existing literature.
- The sufficiency of the scope of the work.
- The clarity with which the completed work is communicated.
- The validity of the methods, conclusions and assessment of the accomplishments.

Your Honors Thesis serves to permanently document your contributions to the body of knowledge in your research area. As such, bound copies of all successful theses are kept in both the college and the department libraries. In addition, the department presents each student awarded departmental honors with a bound copy of the thesis for their personal library.

The Public Presentation:

At the conclusion of your research project you will give a Public Presentation of your thesis. Your Public Presentation will be held on campus and will be attended by your advisor, committee, and the department faculty. The broader college community including your fellow students, other faculty, administrators, family, friends and local community members are also invited to attend. The presentation is expected to last approximately 30-40 minutes and will be followed by a question and answer session with the audience.

Your presentation will be evaluated by how effectively it communicates, to the above audience, what you have done, why you have done it, what you have found and the significance of those findings. While this is the only presentation required for departmental honors, your thesis advisor may also encourage you to present your work at an educational or professional conference.

The Defense:

The Defense of your thesis will occur immediately following your public presentation. The Defense is a private question and answer session attended by your advisor, your thesis committee and the department faculty.

The quality of your defense will be judged by the accuracy, clarity and completeness with which you respond to questions posed by your advisor, committee and the department faculty.

The Vote:

Following The Defense, your advisor, thesis committee and the departmental faculty will deliberate in private. The advisor, on behalf of the thesis committee, will make a recommendation to the department that departmental honors be awarded. The merits of that recommendation will be debated and raised for a vote. The recommendation may be approved or rejected by a majority vote of all present permanent full-time department faculty. Alternatively, a provisional recommendation to award departmental honors can be voted with a list of concerns to be addressed. The candidate will be informed of the result of the vote as soon as it has taken place. In the event of a provisional recommendation, the thesis advisor will ensure that the concerns are addressed and will report to the full department faculty that the concerns have been addressed or that the candidacy for departmental honors has been withdrawn. In all cases, the receipt of departmental

honors is contingent upon the submission of the final thesis by the end of the final exam period of the senior year.

Deadlines:

To be considered as a candidate for departmental honors you will need to meet each of the deadlines described below.

1. *By June 1 of the summer following your junior year:* Declare your intent to pursue departmental honors by submitting to your advisor the Intent to Pursue Departmental Honors form from the Department web page.
2. *By the Monday of the fourth week of class of your senior year:* Submit a Formal Research Proposal to your advisor posing and justifying your research question and detailing the work you will perform during your senior year.
3. *By the first Monday in December of your senior year:* Form a thesis committee and submit a Research Report to your thesis advisor.
4. *By the Friday after spring break of your senior year:* Submit an advisor approved draft of your Honors Thesis to your thesis advisor and committee.
5. *By one week prior to your Public Presentation and Defense:* Submit the final draft of your Honors Thesis to your thesis advisor.
6. *By the end of classes of your senior year:* Give the Public Presentation and Defense of your thesis.
7. *By the end of finals of your senior year:* Submit your completed Honors Thesis to your thesis advisor. Honors will not be awarded if the thesis is not submitted.

While these are the standard deadlines your thesis advisor, in consultation with the department may be able to grant exceptions and extensions in unique circumstances. In addition, your research advisor may require you to meet additional deadlines for things such as preliminary results and rough drafts. Within two weeks of each formal deadline you will receive feedback, through your thesis advisor, regarding your progress toward departmental honors. If deficiencies exist in the progress or quality of your work your advisor will set additional intermediate deadlines. Consistent failure in meeting formal or intermediate deadlines will result in your removal as a candidate for departmental honors. Students, in consultation with their thesis advisors, may also voluntarily withdraw themselves as candidates for departmental honors at any time. Students using their honors project for academic credit (independent study or senior seminar project) who are removed from or voluntarily withdraw from candidacy will be expected to continue their project in order to receive the academic credit. The shape of the continued work necessary to earn credit must be negotiated with the advisor of any research credits and/or with the instructor of the senior seminar (Computer Science).