The UTCS Honors Thesis Guide

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1 Introduction

Undergraduate students at UT Austin are highly encouraged to engage in research, through options such as:

- the *Freshman Research Initiative*;
- *C S 370 Undergraduate Reading and Research*;
- *C S 370F Undergraduate Reading and Research: Writing*; and
- *C S 379H Computer Science Honors Thesis*.

Each option has a different focus, and may lead to different outcomes. This document will walk you through the ins and outs of C S 379H.

C S 379H provides highly qualified undergraduates with an opportunity to participate in a research project under the direct supervision of a faculty member. This course should be of special interest to students planning research-oriented careers and intending to pursue graduate study. Students successfully completing C S 379H and meeting GPA requirements are awarded the distinction of graduating "With Special Honors in Computer Science". Successful completion includes defending your thesis in front of your thesis committee. *Consider pursuing C S 379H only if you are intending to write and defend a thesis.*

To give students a preview of graduate-level research, C S 379H has been designed to mimic the process of doing a master's thesis or doctoral dissertation: the student must find a supervising instructor, decide upon a research project, work at his or her own pace to produce results, write a thesis describing the research, and then defend it in a presentation before a group of faculty members.

2 Frequently Asked Questions About C S 379H

Here is a list of some of the common questions about the C S 379H process, and their answers.

2.1 Who writes a honors thesis?

You could be writing an honors thesis in the following scenarios.

- You are in the *Turing Scholars Honors Program*. An honors thesis is mandatory for you to have the Turing Scholars designation on your diploma.

- You are in the *Texas CSB* program and you would like to write an honors thesis. At this time, an honors thesis is not mandatory for the Texas CSB program.
- You are in another honors program such as the *Dean's Scholars* program that requires you to write a thesis.
- You are not covered by any of the preceding scenarios but you would like to write an honors thesis and graduate with "Special Honors in Computer Science".

2.2 What constitutes a "thesis"?

What makes a piece of research work a *thesis* is framing it within the context of the scientific method. This means that you need to position the work as the response to a scientific question (a hypothesis). What it definitely is not is a lab report of all the activities you undertook during the semester.

Depending on the coin of the realm of the particular sub-area of computer science, your approach to answering the question will vary. For theoretical computer science, it will likely involve proving some theorems; for operating systems work, it will likely involve writing software and evaluating its capabilities; for an applied or interdisciplinary area, it may involve a combination of techniques from both disciplines. But in the end, your research work, as described in your thesis document and presented by you at your defense, must close the loop back to the hypothesis. *Remember that a negative response to a hypothesis, while perhaps not as exciting, can still be quite important and be a perfectly reasonable thesis.*

2.3 When should I take C S 379H?

You are encouraged to start research as early as you wish. C S 379H should be the culmination of your undergraduate research journey, rather than the beginning.

Many students take C S 379H their last semester before graduation. If you do this, plan your schedule carefully to ensure you have the time needed to complete your project without delaying your graduation. Be aware that job interviews and site visits will take away from your research. Please note that unsuccessful completion of C S 379H, *including the written thesis and defense*, may result in delayed graduation or the loss of the honors distinction.

If you are applying to graduate school, taking C S 379H a semester earlier may be worthwhile. This will allow you to describe your research in your graduate school application, and your supervising instructor may provide a valuable letter of recommendation.

2.4 What are the prerequisites for taking C S 379H?

In order to take CS 379H, you must meet the following requirements:

1. You must have at least a 3.0 overall UT grade point average (GPA).
2. You must have at least a 3.5 CS GPA. Your CS GPA is computed using all grades you have earned in UT courses having a "C S" prefix.
3. You must have completed all of the following coursework with a grade of at least C- in each: C S 311 or 311H, C S 314 or 314H, C S 429 or 429H; M 408C, 408K or 408N; and nine additional semester hours of upper-division coursework in C S.

4. You must have the consent of research supervisor and departmental honors advisor. (This is done through the registration process.)

5. You must have completed any upper-division CS courses relevant to your area of research, as determined by your supervising instructor. (For example, if you are interested in working in the area of operating systems, you must first complete C S 439.)

Additionally, you are strongly encouraged to have taken a C S 370 before registering for C S 379H. In the absence of this, you will need to show other evidence of research and a strong endorsement from your research supervisor.

2.5 How do I find a research supervisor?

It is your responsibility to find a faculty member willing to supervise your research. Be aware that faculty members have limited time and may not be available every semester to supervise C S 379H projects. Make arrangements early, preferably by the start of pre-registration the semester before you will begin your project.

Faculty members will be more agreeable to supervising you if you have done well in their courses and if your interests are similar to theirs. Brief descriptions of our faculty's research interests can be found on the CS Faculty/Researchers page on *our departmental website*.

If your research supervisor is not from the CS department, *your second reader must be a faculty member from the CS department*. Meet with your second reader early, and keep him or her updated on an ongoing basis throughout the semester. All of this is to avoid the situation where your non-CS research supervisor has led you into some work that is not acceptable as a CS honors thesis.

2.6 How do I select a research topic?

There are several ways to find a topic for a C S 379H project. Occasionally, students know exactly what problem they want to work on. More often, students rely on faculty members for suggestions.

Some faculty members direct large research projects on which both undergraduate and graduate students work. These faculty members may be able to find a piece of the larger project that is perfect for a C S 379H course. Other faculty members may have projects that require only one student to complete.

When you approach a faculty member about supervising you, expect to be asked about your interests. The more specific you can be, the easier it will be for the faculty member to help you select a topic.

There is perhaps nothing more important than finding a project that you enjoy and a faculty member with whom you can interact easily. Be prepared to talk to several faculty members about different projects before making a decision.

2.7 How do I register for C S 379H?

Once you have found a supervising instructor and decided upon a project, you should complete the C S 379H Contract *through Docusign*. You will need to input the EID email address of your supervising faculty member, and the form will automatically be routed as need to obtain their signature, as well as the honors faculty advisor's signature.

During the fall/spring semesters, the contract must be started in DocuSign by the 8th class day at 5pm. During the summer, the contract must be started in DocuSign by the 2nd class day by 5pm. We recommend you complete the paperwork the semester before you plan to take C S 379H. Once your contract is complete

and has obtained the necessary signatures, you will be contacted by the CS Undergraduate Advising Office with registration instructions.

C S 379H has an attached writing flag, which can fulfill the upper-division writing flag degree requirement. Regardless of whether you need that writing flag, *C S 379H must be taken as a writing-flag course*. Doing so adds a few requirements to the course.

1. Your supervising instructor must critique the quality of your written expression and suggest ways in which your writing may be improved.

2. The quality of your written expression must be a factor in determining your course grade.

2.8 What role does the second reader play?

While you are working on your research, you should make arrangements with a faculty member to serve as your second reader. This faculty member will read your thesis, attend your presentations, and approve the work you have done.

Your research supervisor will generally assist you in finding a second reader. If your research supervisor is not from the CS department, *your second reader must be a faculty member from the CS department*. Meet with your second reader early, and keep him or her updated on an ongoing basis throughout the semester. All of this is to avoid the situation where your non-CS research supervisor has led you into some work that is not acceptable as a CS honors thesis.

2.9 Are there specific requirements for the thesis document?

Your thesis should be a complete and concise description of the work you have done. It must be acceptable to your supervising instructor, the second reader, and the external thesis committee member.

Format your thesis document using LaTeX, using a single-column, single-spaced, report document style. A separate title page should include the title of your thesis, your name, your supervising instructor's name, and the date.

At this time, there is no standard document template for the thesis document. Such a template is in the works.

Make sure that your thesis document is easily understandable to a general CS audience of your peers. They should be able to understand the motivation for the work, the problem that you're solving, and hopefully have some high-level understanding of your solution, your major results, and your key insights. The details of your thesis may not be so broadly accessible.

2.10 What happens at the oral presentation?

In addition to your written thesis, you must give an approved oral presentation to your supervising instructor, second reader, and an assigned member of the Undergraduate Thesis Committee. Successful completion of the thesis and defense will constitute the honors graduation requirement or graduation with "Special Departmental Honors".

The oral presentation follows the typical format of a graduate thesis defense. You will speak in a public meeting for around 30 minutes, giving a presentation of your thesis to your committee and an audience of your peers. This will be followed by a Q&A session, first with general members of your audience and then with your committee members. Finally, the committee members may choose to ask you additional questions in a closed setting.

Following these stages, the committee members will deliberate and vote on the outcome of your thesis and communication their decision to you. It is fairly typical for the committee to ask for some revisions to your thesis document as part of the decision.

3 What Is The Thesis Workflow?

The semester the student is enrolled for C S379H will be a very busy one. In addition to completing the thesis research and writing the honors thesis, there are several deadlines to be met during the course of the semester. Below is a typical schedule of deadlines related to the honors thesis.

- **First Month**
  - Student and supervisor must finalize Second reader.
  - Student confirms that their second reader will be in town for the oral presentation (see below) and will be available to review the thesis during the last two weeks of class and first week of exams.
  - Honors Advisor communicates external committee member assignments. The student's Honors Thesis Committee consists of the supervisor, the second reader, and the external committee member assigned to the student.
- **Second Month**
  - Student and supervisor finalize date and time of oral thesis presentation in consultation with the honors thesis committee. The talk must be scheduled the week prior to the last week of class, at a time convenient to the committee.

    The Honors Advisor identifies a few days near the end of the semester for scheduling thesis presentations in a batch. However, if you want to schedule your presentation earlier in the semester, that can be done as well; email the Honors Advisor to arrange it.
  - Presentations are scheduled for an hour; the actual talk time should be approximately 30 minutes.
- **Third Month**
  - Student submits thesis draft to her/his committee.
  - Oral thesis presentations take place. Expect to receive feedback from committee.
- **Last day of classes**
  - Students submit their final thesis documents to committee and to department.
  - Students complete the Publication Release Form and submit to the department.

4 Conclusions

This concludes the description of many of the important questions about the honors thesis. This document is actively maintained and updated, so please email *the departmental honors advisor* with your questions, feedback, and suggestions for improvement.

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