

Rules and Principles Governing  
ASCS CIS 498 Project and Thesis  
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ASCC CIS 498 Project and Thesis  
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Fall Semester 2021

Adapted from guidelines originated by Prof. Max Mintz

**Summary:** The purpose of the document is to delineate the requirements that must be satisfied in order to successfully complete the ASCS/ASCC CIS 498 (formerly known as EAS 499) Senior Capstone Thesis. In addition to these stated requirements, this document also offers guidance on how to approach this project-oriented course.

#### Rules and Principles:

1. The degree of mix between theory and application for this project is, within reason, negotiable. The most important thing is that you find a suitable project that meets the requirements stated below, and one that you are really excited about. History shows that lack of excitement on your part leads to degraded performance or even disaster. With a suitable and exciting project, you are much more likely to work on it consistently throughout the term and not leave it all go to the end. Leaving it go to the end results, with high probability, in a disaster, i.e., failure to graduate for “May 2022” grads.
2. If you have not already developed a suitable and exciting proposal topic, you need to do this **now**. Ideally, the energy and insights needed to make this happen are generated internally. It is not unreasonable for us to expect that there are aspects of your educational experience in CIS and the wider world that define a set of possible projects. It is up to you to then sell one of these ideas to a faculty adviser in CIS, or SEAS, or outside SEAS. The adviser implicitly promises to guide you where needed. The adviser will not drag you kicking and screaming to the finish line. Obviously, the adviser needs to be knowledgeable about the project domain and be enthusiastic about the project. **The student is responsible for fully informing the thesis adviser about all CIS 498 course requirements and expectations.**
3. Since this is a CIS course, there should be a substantial substrate of CIS embedded in the resulting thesis. The amount of CIS substrate is a judgment call that, if necessary, we will help you make. There is no requirement that you write programs as part of this project. This project could be a very extensive literature review about some new CIS-related technology, “X,” that you explore, and show its potential impact on the wider world. A literature review of this new technology must demonstrate that the author has a deep understanding of the scientific and engineering basis for this technology. A review that merely summarizes various sources without showing a deep integrated understanding of the technology will be deemed insufficient. A useful guide for **depth and breadth** appropriate to your thesis may be found by looking at feature articles published in the **Communications of the ACM**. (Also, see below for “Grades”.)

4. The project proposal should be about two single-spaced pages in length and include:
  - (i) your name and email address
  - (ii) a short project title and date
  - (iii) your adviser(s) name(s) and email address(es)
  - (iv) an abstract
  - (v) an introduction
  - (vi) a description
  - (vii) a paragraph about why we should care about this
  - (viii) expected outcomes
  - (ix) a schedule
  - (x) initial set of bibliographic references

**Please submit your proposal online via forms.cis.upenn.edu.** We will review all of these proposals. If there are required changes, the proposal will be returned for revision and resubmission, and iterated as needed. Once your proposal is approved, the department will register you for the course.

5. There are four major milestones for CIS 498:
  - A. **The completed project proposal must be submitted by 12 noon, Wednesday, 15 September 2021. A form without a thesis adviser and his/her/their email contact information will be deemed incomplete. We will ask the listed advisor(s) for their approval.** The proposal will be counted towards the final course grade. As soon as possible after proposal submission we will respond with a decision of: Acceptable, Not Acceptable (why), or Needs Revisions (list).
  - B. We require **a complete outline of your BAS thesis. This is due by 12 noon, Friday, October 1, 2021.** Advisor approval upon submission is required. The outline should be based, of course, on the project proposal, with any appropriate and requested updates. The outline should consider not just the **structure** of your thesis, but **must also include a suitable topic sentence for each outline entry.** Include in the outline document: a title, your name, your advisor's name and email addresses for all.
  - C. **You will schedule a 15 minute maximum Zoom meeting between you, your project advisor (if at all possible), and Prof. Badler (for ASCS) and/or Prof. Callison-Burch (for ASCC).** This is to ensure adequate communication, feedback, and agreement between all parties. These meetings should occur after the outline is submitted, during the period between **Monday, October 4 and Friday, October 8, 2021.** There may be approval, binding requirements, or helpful suggestions as a result of this meeting.
  - D. You will be required to submit a mid-course draft of your report (Thesis) to **Desirae Cesar and Prof. Badler (for ASCS) or Prof. Callison-Burch (for ASCC) by noon on Friday November 12, 2021.** This should be a single Word **doc** or **pdf** file documenting your thesis progress. It should include and follow the (updated) outline and topic sentence materials, with roughly half of the text in a readable and thorough form. We would like to ensure that you are on track to timely completion. The document can have gaps, lack some illustrations, and require proofreading. What **IS** important is that you are about halfway to finishing and that you are well along on meeting the depth and breadth requirements as discussed in our October meeting. Failure to submit this mid-course draft will reduce your final grade by one step (A->B, B->C, etc).

- E. There must be a written project final report (Thesis). **This report is to be at least a 20-page (single-spaced) document.** Computer programs, tabulated data, extensive figures, and extended bibliographies will not count towards the 20-page minimum requirement. The written project report should be reviewed **first** by your thesis adviser. The thesis adviser will submit a recommended grade and any comments to us, but we will be solely responsible for determining the final grade. A late or incomplete report will receive a reduced grade. **The final report must be submitted to Desirae Cesar and Prof. Badler (for ASCS) or Prof. Callison-Burch (for ASCC) in PDF format. The final report is due by 12 noon, Friday, December 10, 2021.**
6. When writing your thesis keep in mind that your audience should be **Penn CIS Seniors with appropriate undergraduate background knowledge.** You are **not** writing to reach High School students, other Penn students, or your families. This helps you decide what fundamental knowledge you may assume and where you need to describe new material.
7. Team projects are normally **NOT** permitted. Each thesis is deemed to be entirely the work of a single investigator.
8. **SPECIAL NOTE FOR M&T BAS students.** You have an **additional** requirement of using your learnings from the Wharton School and doing a business/economic analysis (maximum 5 pages) of the project. They should meet with Professor Sangeeta Vohra <[vohras@wharton.upenn.edu](mailto:vohras@wharton.upenn.edu)> for the required expectations which can vary depending on the proposal content.
9. **Grades:** There is no default grade nor expectation that mere compliance with these formal guidelines will result in “A” grades. In general, we expect your thesis topic to cover areas not addressed directly in your CIS and related coursework, show integration of these CIS ideas into a relevant area of societal interest or context, and provide both the broad context of why this topic is important as well as some recognized depth in exploring these connections. Depth can be achieved in a number of ways. Some approaches are: explanations, evaluations, and trade-offs among core algorithms and their costs; novel and/or challenging applications that can benefit from new computer science techniques; and actual coding and/or experimental investigations involving real or plausible data sources and analytic tools. **Projects without appropriate depth are unlikely to receive “A” grades.**
10. **Other Requirements:**
- (a) It is understood that the work you submit is your original work. Thus, proper citations to all of your sources must be included. Extensive quoted passages are not a substitute for well-analyzed, summarized, and abstracted content. Penn’s Academic Code of Integrity must be honored: <https://catalog.upenn.edu/pennbook/code-of-academic-integrity/>
- (b) You may include and, if necessary, modify appropriate illustrations from other published materials. You should clearly cite the source in your Bibliography. You should add your own captions and figure numbering. Any purpose, relevance, and content of an illustration should be discussed in your text. Figures are welcome, but they do not count in your 20 page minimum length, as noted above.
- (c) Since your work, in its entirety, should be subject to dissemination to the faculty and students in CIS and SEAS, the application of any **non-disclosure agreements is completely prohibited.**
- (d) According to Penn Intellectual Property rules, your own your own work. However, this also

makes you responsible for respecting any copyright interests of others (e.g., with respect to “borrowed” illustrations) should you seek to publish all or part of your thesis on your own.

- (e) It is also understood that the academic work leading to this thesis was undertaken solely for CIS 498 in Fall 2021, and was not a derivative of other papers or other work produced for or in conjunction with other courses, academic programs, or outside work, e.g., internships. In case of any doubts, please check with us and provide evidence for the background material and how CIS 498 will go well beyond it.

11. **Honors Work in CIS 498:** Prior examples of superior CIS 498 Senior Capstone Theses (the previous course number was EAS 499) can be found on the CIS Department’s website at:

<http://www.cis.upenn.edu/current-students/undergraduate/courses/index.php>