



COLORADO STATE UNIVERSITY

PhD Advising Topics

Dissertation and Final Defense

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Introduction

- Dissertation Credits in the PhD program
- Final Defense for the PhD
 - Dissertation Document
 - Final Defense Presentation



Dissertation Credits in the PhD

- Dissertation Credits
 - **SYSE 799A PhD Dissertation Credits: Var [1-9] (0-0-0)**
 - These credits should apply to the development and publication of research results
 - The number and timing of credits are up to the student/advisor but
 - Credits in a given semester should be proportional to work planned/accomplished

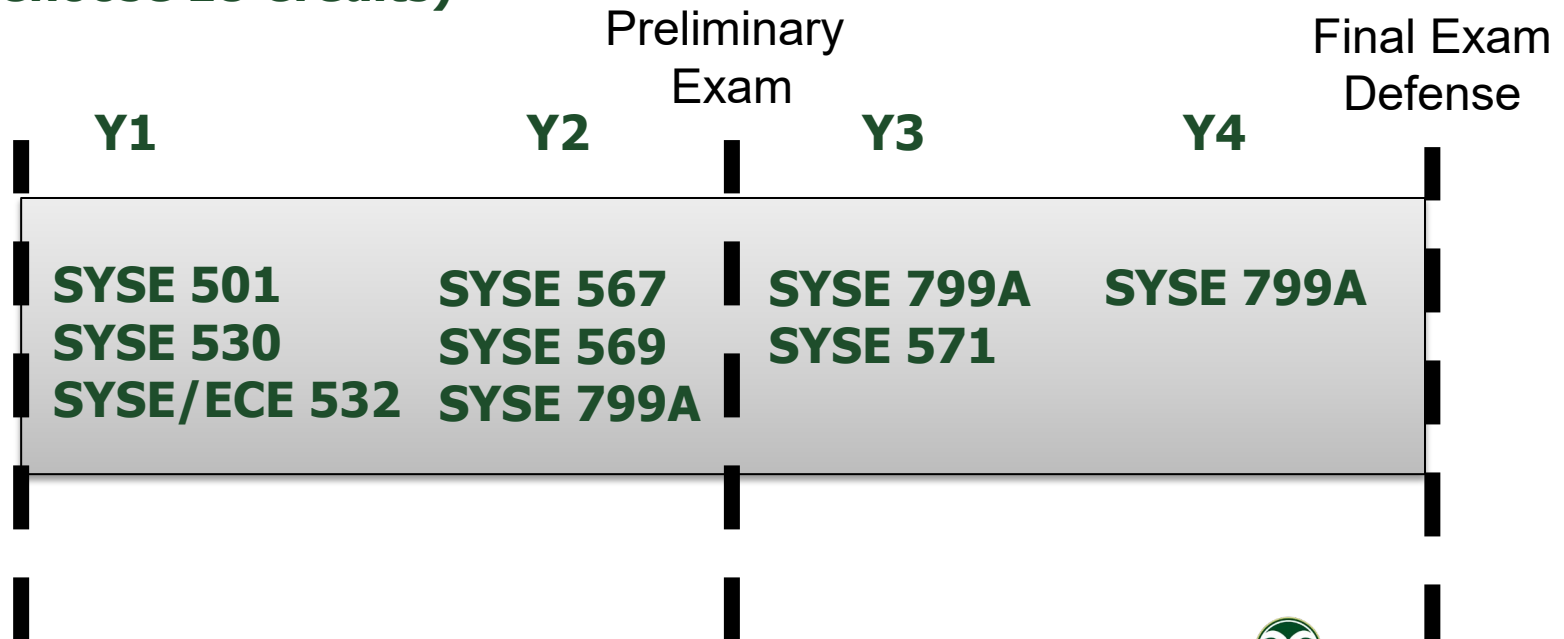


Dissertation Credits in the PhD

PhD Dissertation is made up of 42 credits
(with an applicable Master's degree)

**Systems Engineering
Courses
(Choose 18 Credits)**

**Dissertation Credits
(24 Credits)**



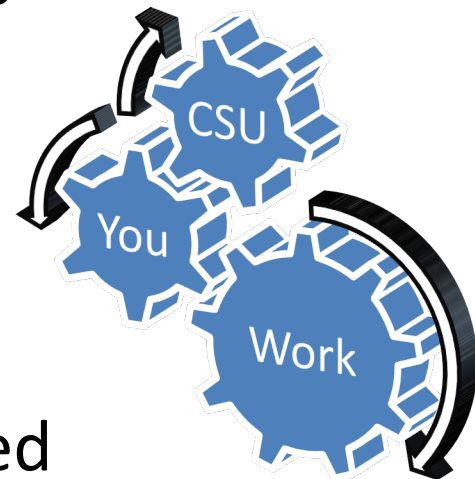
Dissertation Credits in the PhD

- Traditionally Dissertation units have no assignments and no learning objectives
- You should plan on ~1 hr meeting with your advisor 1-2 times per month
 - Highly recommend
 - **Scheduled/Structured meetings** with PPT
 - **Documents** to allow for detailed feedback and approval
 - **Progress tracking** to measure progress towards completion (Annual Evaluation)



Dissertation Credits in the PhD

- Some observations
 - Credits should be aligned with and roughly equivalent to effort (don't take 9cr/sem, don't take 0 if you doing tasks)
 - You should be able to use these credits to justify your time spent on research tasks to your employer
 - It is difficult to motivate to do work when you don't have the hours/credits/audience/advising aligned with the effort



Final Defense

- The final exam for the PhD is made up of two parts:
 - The Dissertation (document)
 - The Defense (presentation)



Dissertation Document

- Document Outline (No page limit or guidance)

- Abstract

- Introduction and Background

- Research Questions and Tasks

- (Research Question 1)

- (Research Question 2)

- (Research Question 3)

- Research Contributions

- Conclusions

- Appendix

*Can be 90% copied from
your proposal document*

*Can be 90 % copied from your
reports, your publications, your
conf. papers*

*Can be updated from
your proposal document*



Dissertation Document

- Must follow the CSU Graduate School format
 - <https://graduateschool.colostate.edu/thesis-dissertation/>
- Any formatting of references is acceptable (APA, Harvard, IEEE, etc.)
- Plagiarism should be strictly avoided
 - The dissertation document must be authored by you
 - You can reference ideas from others
 - You can quote others' text
 - You can cut and paste from your authored reports and papers
 - 99% of figures must be made by you



Dissertation Document

Good form in answering the research questions is to write a transition at the beginning and end of the chapter to address the questions directly

Chapter 3 – Experimental investigation of the perceived value of model-based systems engineering

This chapter addresses the research question 1, which is restated as follows:

RQ1 – In what ways is MBSE perceived by practitioners to provide value to MBSE-enabled robotics design projects?

The research to address this question has been previously described in a peer-reviewed report to NASA’s MBSE working group [49]. This chapter represents a further refined version of this publication.

3.1 Introduction ...

3.n _____ ...

3.9 Conclusion ...

Upon completion of this research, I am now prepared to answer research question 1. This research provides evidence to support the assertion that MBSE is a toolkit that has perceived value at an organizational and an individual level. To the organization,...



The Defense

- Steps for success
 - Work with your advisor and committee to have your document at 100% highest quality ~1 mo in advance
 - Use Doodle or other professional tool to find time to do the presentation (choose among 5 ± 2 options)
 - Every student has access to CSU calendars, through CSU O365, and send out calendar invites (<https://www.acns.colostate.edu/email-accounts/>)
 - Send your document (send as pdf) to the committee. They must have 10 business days to review. Do not send out the PPT.
 - You are invited to do the presentation on campus, online is also acceptable. All students have access to Teams through CSU O365
 - Business professional attire <https://www.pinterest.com/wisconsinbba/> (profs may not always conform)



The Defense (presentation)

- Presentation Content (option 1)

- Title Slide (1 pp)
- Acknowledgements (1 pp)
- Outline (1 pp)
- Introduction and Background (5 pp)
- Research Question 1 (5 pp)
 - Restate RQ1, Results of tasks associated with RQ1, Answer to Research Question 1 (1 pp)
- Research Question 2 (5 pp)
 - Restate RQ2, Results of tasks associated with RQ2, Answer to Research Question 2 (1 pp)
- Research Question 3 (5 pp)
 - Restate RQ3, Results of tasks associated with RQ3, Answer to Research Question 3 (1 pp)
- Research Contributions (1 pp)
- Conclusions and Future Work (3 pp)
- Q & A Prompt (1 pp)

- Presentation Content (option 2)

- Title Slide (1 pp)
- Acknowledgements (1 pp)
- Introduction and Background (5 pp)
- Research Questions (3 pp)
 - Restate RQ1-3 (3 pp)
 - Results of tasks associated with RQ1 (3 pp)
- Answer to Research Question 1 (1 pp)
- Results of tasks associated with RQ2 (3 pp)
- Answer to Research Question 2 (1 pp)
- Results of tasks associated with RQ3 (3 pp)
- Answer to Research Question 3 (1 pp)
- Research Contributions (1 pp)
- Conclusions and Future Work (3 pp)
- Q & A Prompt (1 pp)

30+ slides in 40 mins means that you are going very fast
You will not be able to do justice to all the work that you did in your research over 3-4 years, so instead you must pick and choose effective, high impact, cohesive results.



The Defense (presentation)

- Review presentation best practices
 - <https://homes.cs.washington.edu/~mernst/advice/giving-talk.html>
 - <http://www.cgl.uwaterloo.ca/csk/presentations.html>
 - Structure, clarity, organization, style, figure formatting, etc.
 - Mistakes are unacceptable
- Most engineers are not great at presenting, this is your chance to shine
 - Memorize a *mirrored* “intro” and “outro” to convey organization and impact (start and close a story in these sections)
 - SE is a field in which it is hard to convey the level of difficulty
 - Use visual frameworks to convey methods
 - Use equations, flow charts, design structure matrices (not code)
 - Present sample results before presenting ensemble results



The Defense

- What is the committee evaluating ?
 - Errors in analysis, results, or interpretation (statistics, graphics, math, optimization, meshing, etc.)
 - “Reasoned challenges” Your results say X, but this other paper says Y. Your results conflict with this existing model, why? Unreasoned challenges do not stand.
 - “New knowledge in the field” must be defined
 - (if you are smart enough to define it)



The Defense

- What is the committee evaluating ?
 - The process of research is important and so must be documented
 - It is assessed on the basis of
 - Scholarship, repeatability, “systematic approach to the development of new knowledge,”
 - No unconsidered/unevaluated processes, no lightning strikes of genius allowed.
 - Publication and peer review



The Defense

- Committee will excuse you to the hall to come up with recommendations
 - You are then invited in for congrats and communication of takeaways (80% pass)
- Most often, the committee will suggest changes to your process or document.
 - Make the changes, work with committee members to gain their approval.
 - 2 weeks for you to turnaround any changes is not unusual



The Defense

- Graduation
 - Come to CSU, graduate with your advisor

