



Graduate Education Thesis & Dissertation Writing Workshop

Fall 2024

Maribeth Price, Dean of Graduate Education

Part I: Guidance on writing your thesis or dissertation

The Office of Graduate Education

- O'Harra 102F

- Maribeth Price

- Dean of Graduate Education

- Rachel Howard

- Admissions, applications, assistantships

- Leslie Hill

- Student progress, POS processing, degree audits, thesis/dissertation processing



Are you officially a thesis student?

Program of Study not required for non-thesis option

NON-THESIS OPTION

Fundamentals of Materials Engr MES 601

Course

Program of Study MS Plan of Study

THESIS OPTION

Fundamentals of Materials Engr MES 601

- MS students
 - Check your DegreeWorks audit
 - If it says non-thesis, you need to file your Program of Study (POS)
 - Officially designates your major professor and committee
 - Plans the courses for your degree
 - Due in your second semester (first for accelerated students)

Responsible Conduct of Research

- Already required for students supported by certain grants
- Required for ALL thesis/PhD students effective Fall 2024
- Free online course offered by Collaborative Institutional Training Initiative (CITI)
- Keep your certificate to include in your Program of Study
- Recommended even if you have submitted your POS already



How you earn a research degree

- READ journals to find a question that hasn't been answered or a problem that hasn't been solved
- DEFINE a question and methods to answer it
- DO the research
- WRITE up the answer
- DEFEND it publically
- PUBLISH it



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Who is responsible?



- This is YOUR project
 - Your ideas
 - Your work
 - Your writing
 - Your job to finish
- However, many others will help if you ask:
 - Your Advisor/Major Professor
 - Your Program's Graduate Coordinator
 - Your Committee
 - Your Department
 - The Office of Graduate Education
- Outstanding training for workplace projects



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The process

Where to start, how to proceed

CURIOUS SMART TENACIOUS

Where do I start?



- Define a topic area and establish committee
- Review the literature
- Develop a research question/hypothesis
- Develop and refine methods
- Collect and analyze data
- Write up the results
- Get approval of document from advisor
- Get approval from committee
- Defend
- Revisions and final edits

Process is not as
linear as it appears!

Define a topic area



-
- What do you want to be an expert in?
 - What skills/knowledge do you want to gain?
 - What professional areas interest you?
 - What do you think will help you find a job?
 - What can your advisor give you funding for?

Ideally, the topic excites and interests you. You will be spending a lot of time on it—it helps if it enjoyable.

Establish a Graduate Committee

- Guides your coursework and research
- Master's committee (3 or more)
 - Major professor (has at least a master's degree)*
 - Graduate Division Representative*
 - At least one additional member
- Dissertation committee (5 or more)
 - Major professor (must have a PhD)*
 - Graduate Division Representative*
 - At least three additional members



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*** Must be full-time Mines faculty**

Graduate Division Rep must be from another department/program

All members must have a minimum of a BS degree

Off-campus members OK...

... but committees must have at least three and/or a majority of full-times Mines faculty

Committee roles

- Major professor

- Guide student's coursework
- Assist student in choosing a committee
- Assist student in developing research problem
- Guide student's research and progress
- Mentor student's development as a research professional

- Graduate Division Representative

- Uphold Graduate Education and University scholarly standards
- Assure that procedures are correctly and fairly applied
- Participate in examinations and provide outcome reports
- Assist in the resolution of committee disputes or student concerns.

- Members

- Assist student to complete research
- Assist major professor in guiding student as needed
- Evaluate thesis for technical and written quality



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Review the literature



- Learn to use search engines to find journal articles, and the library to get them
- Get a bibliography program such as EndNote
- Read, read, read, every week
- Critically review each paper
 - What was established? What questions were answered?
 - What new questions arose? What is the next step? Could you do that next step?
- Develop a way to organize what you learn
- Start writing—the lit review is Chapter 1.

Your research question



- Use your reading and advisor's guidance to develop a research question or hypothesis
 - A good research question can be clearly answered yes or no
 - A good hypothesis is a statement that can be proved or disproved
- Both
 - Define a problem in concrete, definitive terms
 - Define the scope of the problem
 - May be a portion of a larger problem
 - Help you clearly see what to do next

Refine your question

- Is your research question focused? Is it answerable?
- Compare these proposed research problems:



Physiological impacts on intellectual capacity

The effects of caffeine on student performance

College students obtain higher test scores when they consume caffeine before exams.

Plan methods in detail

- What form of caffeine?
- How long before exams?
- What is your control?
- Does student height, weight, or sex matter?
- How is performance measured?



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Develop and refine methods

- What data are needed?
 - Preliminary versus primary
- How will it be gathered?
 - Consult literature for standard practices
 - Determine if new practices will be tested?
- How will it be analyzed?
 - What statistical or analytical techniques are needed? The design must support the analysis.
- What problems might arise? How can the risks be mitigated?
- What results are anticipated?



WRITE your methods



- This is Chapter 2!
- Write the chapter while defining methods
 - The writing process itself helps clarify thoughts
 - You will better anticipate problems
 - Less likely to fail to collect important data
- Include data analysis methods
 - Visualize statistics or figures needed to prove or disprove the hypothesis
- Consult your statistician beforehand

The Proposal

Widely used in industry and academia

Required for MS students

Part of the PhD Comprehensive Exam



- A proposal describes the aim, scope, and method, and deliverables for the work
 - Reviews the literature
 - Establishes the research question/hypothesis
 - Defines the methods
 - Shows preliminary data, if any
 - Poses alternatives in case of “unexpected” challenges and outcomes
 - Establishes objectives and deliverables for the project (in essence, the agreement between you and your committee).

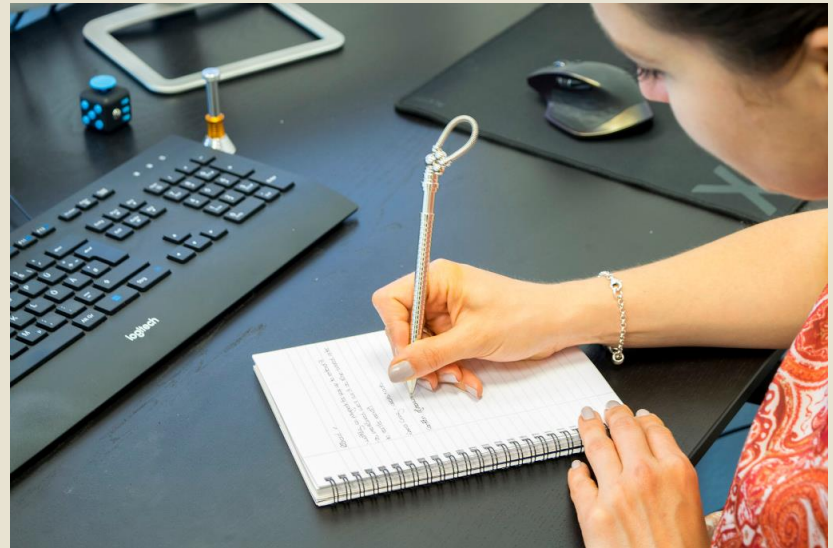
Collect and analyze data



- Meet regularly with major professor to discuss results and plan revisions, if needed
- Be precise and methodical
- Keep excellent notes—on everything
 - Pictures, drawings, figures, files
 - Experimental details, dates, equipment
 - Data, “good or “bad”, ALL of it
 - Lab books are more reliable than computer files
 - BACK UP all data and notes weekly
- If ethical, legal, or ownership issues arise, these records could be needed to defend your work.

Write the thesis

- Revise literature review and methods if needed
- Add results, discussion, conclusions
- Write an abstract
- Check the formatting
- Polish the writing



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Get approvals

- Major professor must approve it before you send to the committee
- Committee must approve it as defensible before you can defend



Committee approvals:

I have reviewed this thesis/dissertation and verified that it appears to be an acceptable manuscript in terms of technical quality and proper expression and usage in American Standard English. *(You are encouraged to provide written comments to the student immediately following your review, so that the student may work on revisions prior to the defense.)*

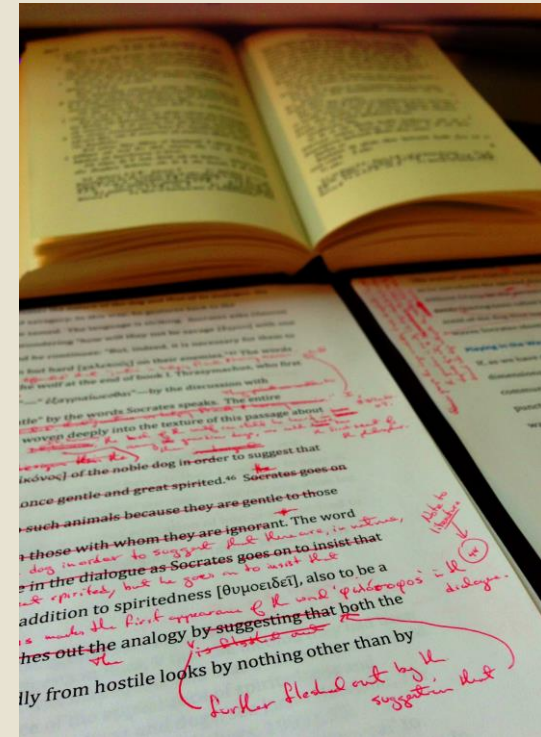
Defend



- The defense is your “final exam”
- Typically a 30-60 minute presentation, open to the public,
- Followed by an oral examination by your committee in private
- **Revisions** usually suggested
- Details on this process are in the next section of this workshop

How to minimize revisions

- Ask for feedback on early chapters
- Consult with the committee as you work
 - Discuss initial results and get suggestions
 - Explore interpretation and conclusions
- Learn to write well and/or edit well
- Expect at least one round of revisions from your major professor before your committee sees the document



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The document

Creating and editing

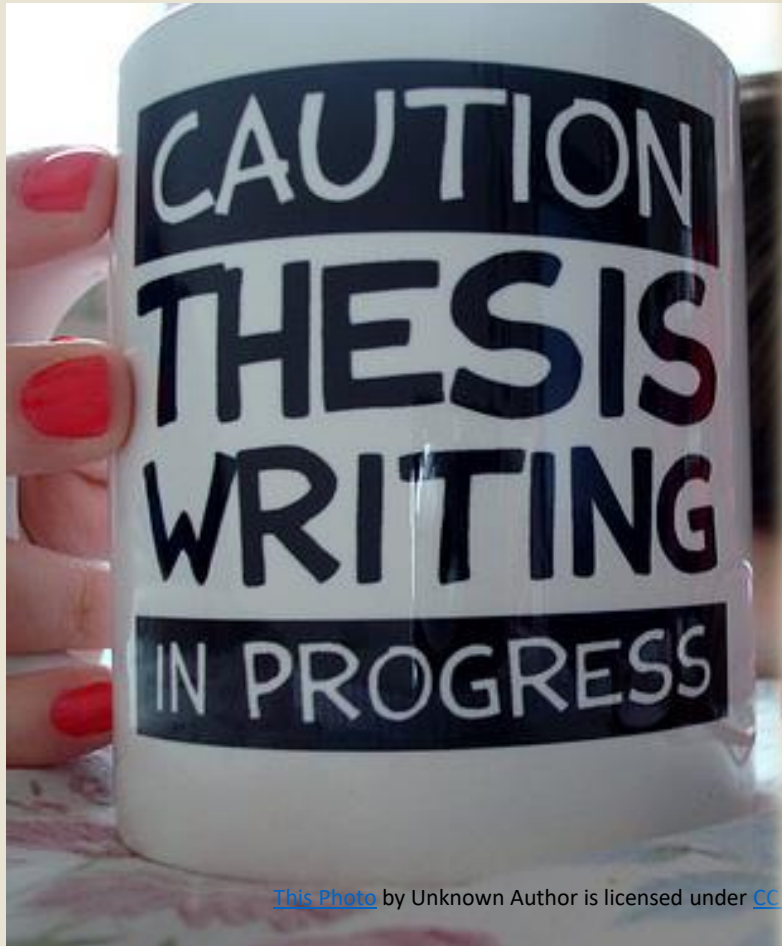
- Specific formatting requirements
- Start with Word or LaTeX template provided
 - <https://www.sdsmt.edu/Experience/Graduate-Education/Forms.html>
- Learn about Word styles or LaTeX to prevent problems
- Watch for workshops

When do you start writing?



- **In your first semester**
- Your proposal is a **first draft** of the thesis or dissertation!
 - Literature review to define the problem
 - Methods to plan how to tackle it
- Add to the draft as you read more papers, get results, create figures, interpret data.
- Put it all in; you can edit later
- For the final draft, you will be selecting, refining and interpreting what is already there

Dealing with writer's block



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- Treat it as an ongoing, evolving document
- Everyone's first draft is imperfect!
- Don't worry about writing well at first
 - Get your thoughts down
 - Revise and edit later
- Write or edit something every week
- Update new lit review results or method changes as you go
- Make regular backups in at least two places

Revising with your major professor



- Check whether he/she prefers individual chapters as you go, or a single document at the end.
- Check preferred format (paper, Word, PDF)
- Perfect your writing, so advisor can focus on your research, not your grammar
- Implement revisions before asking for more feedback!!!

Stay determined



- There will be MANY iterations between you and your major professor, often more than you anticipated.
 - Lots of bold, red edits will come your way
 - Cultivate a positive attitude in response to constructive criticism.
 - Not all faculty as practiced in commending the positive as they are in finding things to fix...
- Allow sufficient time to complete final version
 - The “defense draft” should be given to major professor for approval **8-10 weeks** before the end of the semester you intend to graduate.

Using AI for research



- [Mines Guidance on using GenAI in research](#)
- Basic precepts
 - Use to help—not generate full documents
 - Document your usage in detail
 - Check with publishers-do they allow it?
 - Certain uses may constitute a public release – be careful with restricted work
 - Never submit someone else’s work to GenAI
 - Review output carefully for hallucinations or errors
 - Make sure you test all references to make sure they are real

Traditional style

Or MS 1 journal manuscript

- Title Page,
- Abstract,
- Acknowledgements,
- Table of Contents,
- List of Tables,
- List of Figures,
- **Introduction**
- **Theory and/or Literature Search**
- **Methods**
- **Results**
- **Conclusions**
- Bibliography,
- Appendices,
- Vita.

Journal style

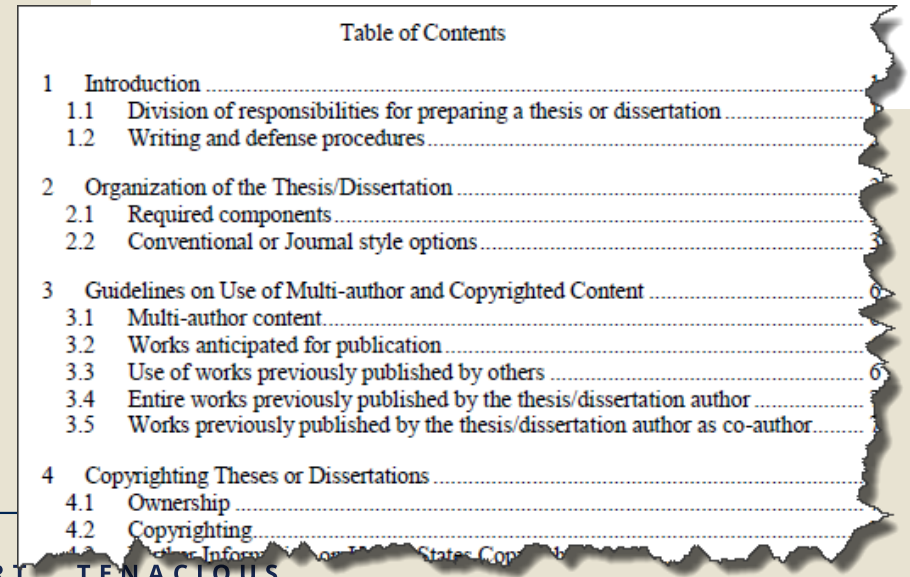
2 or more journal manuscripts

- Title Page,
- Abstract,
- Acknowledgements,
- Table of Contents,
- List of Tables,
- List of Figures,
- **Introduction** *to the full body of work represented by the articles*
- **Two or more journal articles,**
- **Conclusions** *including a summary of conclusions from the articles and implications from the work as a whole*
- Bibliography *of all references,*
- Appendices *(include documentation for permission to reproduce published articles),*
- Vita.

Chapter titles and organization are flexible to accommodate differences in disciplines, but these components should be present and recognizable.

Thesis/Dissertation Writing Manual

- Read this document early on
- Saves time if you format the proposal and early drafts correctly
- LaTeX and Word templates available
- Learn to use Word styles
- Use a bibliography program for citations

The image shows a page titled 'Table of Contents' with a decorative, torn-edge border on the right side. The table lists the following sections and their corresponding page numbers:

Table of Contents	
1	Introduction 0
1.1	Division of responsibilities for preparing a thesis or dissertation 0
1.2	Writing and defense procedures 0
2	Organization of the Thesis/Dissertation 0
2.1	Required components 0
2.2	Conventional or Journal style options 0
3	Guidelines on Use of Multi-author and Copyrighted Content 0
3.1	Multi-author content 0
3.2	Works anticipated for publication 0
3.3	Use of works previously published by others 0
3.4	Entire works previously published by the thesis/dissertation author 0
3.5	Works previously published by the thesis/dissertation author as co-author 0
4	Copyrighting Theses or Dissertations 0
4.1	Ownership 0
4.2	Copyrighting 0

Restricted thesis or dissertation



Restricted-access theses or dissertations are restricted by either:

- (A) Federal Law as (i) *Export Controls*: EAR (Department of Commerce), ITAR (State Department), FAC (Department of Treasury) or (ii) *Antiquities Acts*
- (B) Intellectual Property concerns, namely proprietary Information (either by contract with a private company, or SDSM&T proprietary information).

Things to know about **restricted** work



- It shouldn't delay graduation
 - Does delay publication
 - May impact your job search
- Defense attended only by the committee
- Library copies embargoed for defined period
- Restricted work must be declared as such when you schedule the defense.
- Discuss whether your work will be restricted with your major professor before you start.
- Don't use AI to help write or polish restricted work.

Looking ahead



- More info during the next session
- You must stay continuously registered or on leave until you finish
- You must complete the degree within 5 years (MS) or 8 years (PhD)
- The defense process will take longer than you think.
 - Final written draft should be completed by mid-term of your final semester

Suggested Writing Resources



- Purdue University [Online Writing Lab \(OWL\)](#)
- Purdue University [Using Articles](#)
- Grammarist.com [What are Articles?](#)
- The Punctuation Guide [Punctuation Guide](#)
- University of Rhode Island [Becoming a Better Writer](#)
- University of Arizona [Preparing for Graduate Writing](#)



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Most common writing errors at Mines

A decorative horizontal line consisting of a series of slanted, parallel dashes in a gold or yellow color, extending across the width of the slide below the title.

- Improper use of commas
- No noun after “this” or “these”
- Wordy or confusing style
- Colloquial phrasing
- Missing definite or indefinite articles “The” or “A/An”
- Confusion when to use “which” versus “that”

Questions?



- Workshop slides
 - <https://www.sdsmt.edu/Experience/Graduate-Education/Current-Graduate-Students.html>
- Writing manual and forms
 - <https://www.sdsmt.edu/Experience/Graduate-Education/Forms.html>