University of North Dakota
College of Engineering and Mines Energy Studies (CEMES)
Graduate Student Policy Statement
December 2022

Policies for Graduate Research and Thesis

The Thesis is an important part of a student's scientific training in the College of Engineering & Mines Energy Studies. It sums and implements the knowledge gained in various classes and shared experiences to date in a student's life. The thesis also introduces the student to a real-life scientific problem. Thesis preparation follows the typical lifespan of a research project and consists of three separate segments: 1) development of the research proposal, 2) execution of the research plan, with field and/or laboratory analyses, and 3) communication of results. Students will progress through the sequence of classes numbered: ENE 591: Research in Energy Engineering, ENE 998: Thesis in Energy Engineering/ ENE 999: Dissertation in Energy Engineering. Some of these classes may be taken concurrently depending on the type of research that is proposed. We recommend, however, that a student should begin thinking early about their interests in a research project. Note, also. It is recommended that the student start planning his/her research in the second year in the program and start signing up for ENE 591 Research coursework as required. The first task for the student is to consider a research problem. This should go hand-in-hand with contacting potential advisors (mentors) and discussing ideas and approaches. The thesis advisor is usually a faculty member from within the CEMES or related departments. Contact potential advisors early and often to discuss your ideas for a good project.

ENE 591: Research in Energy Engineering

This research course is designed to enable graduate student to formulate, design, conduct and report their research work as they make progress in their program. The plan is to have a draft dissertation report by the time they finish taking their required research credits. As a guideline, the expectations are that students will complete various modules by the time student have completed the cumulative number of credits listed below. The detail information about this course is provided under the course module. The research structure has the following parts:

	Module Report Submission	Cumulative Completed	Credit
Topic Formulation and Abstract		3	

Introduction, Background, and Literature Review	12
Significance of the Study	15
Approach/Methodology	18
Findings and Conclusions	30-45
Final Research Report	

Module 1: Topic Formulation and Abstract

You are expected to explain the problems that the research, thesis, or dissertation attempts to solve, and to outline what other researchers have done to attempt to solve the same or related problems. Then, outline your intended approach or methodology for the project. What are your findings or anticipated outcomes? Please explain the key results of the reviewed paper. Summarize your conclusions. Please remember that this is only an abstract, which should not exceed 300 words and must not be fewer than 250 words.

Module 2: Introduction, Background, and Literature Review

In this module, you are expected to conduct substantial research and produce a lengthy paper on the problem or opportunity you identified in module 1. Should people or the global community be concerned about the situation or position themselves to investigate the opportunity? Please inform when new technologies, situations, or difficulties arise. Has someone else dealt with the described problem or opportunity in the past? Please conduct a thorough literature review to explore and write as much as necessary on everything that has been done concerning this issue or opportunity. What is the state of the art currently? What is the current status of this issue/opportunity? Please summarize the overall scope and objectives of the research, thesis or dissertation review at this point. Describe the particular goals and objectives of the review. You are expected start doing heavy intext citations from this point using the APA 7th edition citation and referencing style.

Module 3: Significance of the Study

In this module, you will be expected to articulate the significance of your study, thesis, or dissertation. You must provide a more thorough or detailed explanation of the issue(s) or opportunity(s). Why should scientists investigate the issue(s) or investigate the opportunities?

We want to know why your committee should support your work and why stakeholders should invest in or finance this research or initiative. Support your point with necessary literature review and citations using the APA 7th edition citation and referencing style.

Module 4: Approach/Methodology

In this module, you will be required to describe in full the approach or methodology you've chosen for your study, thesis, or dissertation. Describe your experimental designs or review methodologies to solve the issue(s) or investigate the opportunities. You should also discuss the methodologies utilized by prior scientists and why you choose to adopt or offer a new approach. Why?

Module 5: Findings and Conclusions

In this module, you will be asked to elaborate on the conclusions of your study, thesis, or dissertation. Were you able to accomplish the research/objectives? review's What are the other results that resulted from these exercises? Please indicate in your conclusion the key takeaways from your research or review. Provide comments on what to do next with the research and other things that can be done to better this area of research.

An Oral Presentation of your proposal will be required as part of Research (ENE 591). Please provide your advisor with the scheduled date and time as early as possible, but no later than one week before the presentation. Plan on one or more practice sessions with your advisor.

Grading:

- **Unsatisfactory**: No apparent logic or coherence in research plan, and/or the scope of research either too small or too large, and/or impossible to obtain the planned results, and/or missing literature review, and/or wrong formatting, and/or missing sections, and/or failure to improve the indicated shortcomings in writing or logic.
- **Satisfactory**: Otherwise, excellent proposal but some gaps in logic, and/or incoherent style of a research plan, and/or some sections missing critical information, and/or many factual errors or missing references, and/or some inconsistencies in formatting.

ENE 998: Thesis in Energy Engineering /ENE 999: Dissertation in Energy Engineering

No later than four weeks before the last day of classes, turn in a completed draft of your thesis. Note that much of it can be adapted from your proposal. Here is an outline of the essential parts:

- **Title** - brief and to the point
- **Abstract** - A 250 words or less summary of your thesis. It should include a sentence or two on each part that follows.
- **Introduction** - What is the problem you will address or question you plan to answer? Why is it important? Why should others care? What is your hypothesis and research questions? (see Chamberlain, 1890)
- **Literature Review** - What is our current understanding of the problem being addressed? Describe the work that others have carried out that relates to the problem you addressed. Briefly summarize the gap in knowledge that you explored.
- **Methodology/Approach** - Provide an overview of the methods you used and then go into each step in detail. Provide sufficient detail to allow someone else to replicate your work.
- **Results/Findings** - What answers did you find? How did the results address the question or hypothesis you presented? Present the results clearly and concisely using text, figures, tables, and appendices.
- **Discussion** - How do your results relate to the work that others have done? Explain the answer to the question you posed.
- **Conclusions** - Summarize your findings.
- **List of References-** (APA 7th Edition)

Typically, your draft will be read by your advisor and returned to you for improvement one or more times. The final draft, with all comments and problems satisfactorily addressed, must be turned in no later than the last day of classes. The final accepted copy of your Thesis is to be provided in PDF format to the department computer administrator for posting on the department web page.

An Oral Presentation will also be required as part of defense. Please provide your Thesis advisor with the scheduled date and time as early as possible, but no later than one week before the presentation. Plan on one or more practice sessions with your Thesis advisor.

Grading:

- **Fail**: No apparent logic or coherence in thesis, and/or the scope of the thesis is either too small or too large, and/or missing results, and/or missing literature review, and/or wrong formatting, and/or missing sections, and/or failure to improve the indicated substantial shortcomings in writing or logic.
- **Satisfactory**: Otherwise, excellent thesis but some gaps in logic, and/or incoherent style of the thesis, and/or some sections missing critical information, and/or many factual errors or missing references, and/or some inconsistencies in formatting.
- **Excellent**: Clear scientific logic, well executed and documented research project of correct scope, coherent easy to follow writing style, all sections fully documented, and perfect formatting and references.

Note: To qualify for the MSc students need to have at least 1 journal publication as the first author.

ENE 999: Dissertation in Energy Engineering

No later than four weeks before the last day of classes, turn in a completed draft of your thesis. Note that much of it can be adapted from your proposal. Here is an outline of the essential parts:

- **Title** - brief and to the point
- **Abstract** - A 250 words or less summary of your thesis. It should include a sentence or two on each part that follows.
- **Introduction** - What is the problem you will address or question you plan to answer? Why is it important? Why should others care? What is your multiple-working hypothesis (see Chamberlain, 1890)?
- **Literature Review** - What is our current understanding of the problem being addressed? Describe the work that others have carried out that relates to the problem you addressed. Briefly summarize the gap in knowledge that you explored.
- **Significance-** Detailed explanation of INTRO item. Why should scientists, in particular study this issue? Why should taxpayers' money go into funding these studies?

- **Methodology/Approach** - Provide an overview of the methods you used and then go into each step in detail. Provide sufficient detail to allow someone else to replicate your work.

- **Findings** - What answers did you find? How did the results address the question or hypothesis you presented? Present the results clearly and concisely using text, figures, tables, and appendices.
- **Discussion** - How do your results relate to the work that others have done? Explain the answer to the question you posed.
- **Conclusions** - Summarize your findings.
- **List of References-** (APA 7th Edition)

Typically, your draft will be read by your advisor and returned to you for improvement one or more times. The final draft, with all comments and problems satisfactorily addressed, must be turned in no later than the last day of classes. The final accepted copy of your Thesis is to be provided in PDF format to the department computer administrator for posting on the department web page.

An Oral Presentation will also be required as part of defense. Please provide your Thesis advisor with the scheduled date and time as early as possible, but no later than one week before the presentation. Plan on one or more practice sessions with your Thesis advisor.

Grading:

- **Fail**: No apparent logic or coherence in thesis, and/or the scope of the thesis is either too small or too large, and/or missing results, and/or missing literature review, and/or wrong formatting, and/or missing sections, and/or failure to improve the indicated substantial shortcomings in writing or logic.
- **Satisfactory**: Otherwise, excellent thesis but some gaps in logic, and/or incoherent style of the thesis, and/or some sections missing critical information, and/or many factual errors or missing references, and/or some inconsistencies in formatting.
- **Excellent**: Clear scientific logic, well executed and documented research project of correct scope, coherent easy to follow writing style, all sections fully documented, and perfect formatting and references.

Note: To qualify for the Ph.D. students need to have at least 2 journal publications (Review and Technical) as the first author.