

**Guidelines for M.S. and Ph.D. Degree Programs**  
**Department of Mining and Metallurgical Engineering (MME)**  
**Mackay School of Earth Sciences and Engineering,**  
**College of Science-University of Nevada, Reno**

*Revision Date: February 2018*

**I. Introduction**

Welcome to the graduate programs offered by the Department of Mining and Metallurgical Engineering (MME) at the University of Nevada, Reno! MME offers separate M.S. program in Mining Engineering and Metallurgical Engineering and a Ph.D. program in Mineral Resource Engineering. The Ph.D. program is an interdisciplinary program having three areas of concentrations: mining engineering, metallurgical engineering and geological engineering. The first two concentration areas are administered by MME, whereas the last one is administered by Department of Geological Sciences and Engineering. Each graduate program is overseen by a separate Program Director.

We hope this handbook will help you to navigate through our graduate programs. You need to be aware of department policies that have to be followed until your graduation. This handbook is a supplement to the Graduate Student Association (GSA) Handbook, which details the policies of the UNR Graduate School. The GSA Handbook documents University standards for course work, thesis preparation, and publication. It presents, in detail, the steps necessary for successful completion of graduate studies at UNR. The UNR Graduate School is ultimately responsible for both

## The Graduate

members, and the Department Chair. *The Graduate School must also be notified of this*

**Changes to the Program of Study**—Once the Program of Study is filed with the Graduate school, the student is obligated to take all of the courses listed in the program. Any changes must be made by filing a Change in Program of Study (Graduate School form).

**Thesis Proposal** –The Department of Mining and Metallurgical Engineering requires that a draft thesis proposal be submitted to the Advisory/Examining

A minimum of 24 credits of graded courses (grade of C or better and listed on the Program of Study) must be completed. A maximum of 9 credits completed elsewhere (Grade B or better) can be transferred and



**Ph.D. Examinations** - Mining and Metallurgical Engineering requires four examinations for a Ph.D. degree.

1. Qualifying Examination: A formal oral examination is administered by the student's Ph.D. Committee to assess the student's general knowledge of engineering and his/her level of preparation for a Ph.D. program. The examination will be scheduled through the Ph.D. Program Director, and consist of a 1-2-hour oral questioning on fundamental concepts in engineering that would be expected for a doctoral candidate at the end of their first year. Subjects typically covered include the fundamental of engineering topics for the disciplines taught at the department. The Committee will report either "pass", "pass with recommendations" or "fail" based on a simple majority vote in writing to the Graduate Program Director. In the case of "pass", the student may continue in the doctoral program. In the case of "pass with recommendations", the committee will provide suggestions for additional coursework or studies that should be undertaken during the student's progress toward the doctoral degree. These recommendations shall be used by the advisor to help define the student's plan of study. In the case of "fail", the student will not be allowed to continue in the department's doctoral program, but may be allowed to complete the requirements of a Master's degree.

For students entering the Ph.D. program without having a master's degree, the university requires that the qualifying examination be taken prior to completion of 24 credits. In MME, the exam is generally taken during the first committee meeting, by the end of the 2<sup>nd</sup> semester of residency. The qualifying exam can be delayed in unusual cases until the end of the third semester.

2. Candidacy Examination. The Ph.D. Candidacy Examination is intended to evaluate the student's overall knowledge and understanding of his/her field gained through his/her course work. Students must sign up for 1 credit of MINE 795 the semester they take their exam with the Ph.D. program director. The candidacy examination includes both oral and written sections and should cover material offered in formal graduate course work completed by the student at UNR. A minimum of three examiners selected by the student and the advisor need to set questions for the examination. An examiner does not necessarily have to be a member of the Ph.D. committee of the student. The written part should be completed over a one-week period, and is followed within two weeks by an oral examination, typically of 2-3 hours duration. The student is admitted to candidacy following completion of residency requirements, course requirements, and acceptable performance on the Candidacy Examination.
3. Dissertation Proposal Examination. In addition to the Qualifying Exam, each doctoral student is expected to submit a formal dissertation proposal to their Advisory-Examining committee and have a committee meeting to seek approval for both the proposal and the proposed Program of Study no later than the end of their fourth semester in residence (does not include summer semester).

Specific guidelines for the Candidacy Examination Procedure:

- A. The Ph.D. program Director and student's Advisory-Examining Committee are jointly responsible for the format of the exam, and for its execution and results.

B.



The Department of Mining and Metallurgical Engineering has several important policies regarding theses and dissertations.

First, the existing Graduate School regulations regarding the format, scope, and organization of the thesis or dissertation are the same regardless of whether the student chooses the “dissertation” or “publication” option. Departmental policy on theses and dissertations in addition specifies that all figures, tables, and captions must be interleaved or embedded within text where first cited, as in published journal articles. Use and follow the guidelines of a refereed journal in your field for headings, citations, figures and captions, and references cited.

Second, the student’s Advisor is ultimately responsible for the research quality. This responsibility resides with the Advisor regardless of any previous or pending publications by the student. This means that publication by itself is not considered by anyone to be a substitute for approval of the thesis or dissertation by the Advisory-Examining Committee.

Third, if a student chooses the “publication option”, the student and advisor will discuss in advance, agree to, and place in writing, a statement defining what publications will be expected of the student. These publications can be derived from, say, chapters of the dissertation, and formatted for the appropriate journals. This approach enables the research to be organized in modules, but it also is expected that the publications will be tied together into a coherent whole, which is the main rationale for writing an extended work such as a thesis or dissertation.

General comments regarding publication--Publication of the significant results of thesis or dissertation research is an important aspect of graduate education, but its role and emphasis can vary between programs. Normally, the M.S. thesis is considered to be sufficient evidence of competence at the Master's level. However, it is often to the student's advantage in the job market to publish part of the thesis. The Department of Mining and Metallurgical Engineering encourages, but does not mandate, publication of the M.S. thesis. However, individual faculty advisors may add to this recommendation as long as this is clearly understood and agreed to by the student and specified in the Program of Study.

Research at the Ph.D. level should lead to publications in refereed scholarly journals. By definition, this work involves new methods, collection of new data, formulation of new analyses, or perhaps construction of new syntheses that advance the state-of-the-art in a particular field. Publication by the student can be very important at this stage of his/her career.

In practice, however, it may be unrealistic or impossible to predict whether or what

Others will probably use your work in years to follow, so it makes sense to understand what is expected in the final form of the thesis or dissertation.

The difficulties and time commitment for the completion of a thesis or dissertation must not be underestimated. Early drafts should be submitted to the Advisor in manageable portions before progressing to a second or third draft to be distributed to the rest of the committee. The committee members will appreciate a clean, better-written draft, and will have a better chance of evaluating the science. Most Advisors will insist on this strategy.

The Advisor and the Advisory-Examining Committee are the “quality control” on the theses and dissertations and many improving iterations should be expected. However, the bounds of modifications should be expected to comply with approved Program of Study. The Committee must be fair with expectations.

Several months (3 or more) is expected for just for the writing an M.S. thesis; additional time is then needed for the reviews and rewriting. Thus, for a May graduation, an M.S. student should be well into writing by September of the previous year. For the Ph.D., eight months to a year of full-time writing are commonly necessary to produce the first draft or two. This effort may be streamlined by planning ahead and discussing each aspect of the research with Advisor and committee members. If the process is followed correctly, there should be very few surprises during the writing phase of the graduate education. The ultimate aim is to defend the thesis or dissertation and at that point only minor changes, if any, should be left to do to the last draft.

**Thesis Credits:** Per graduate school policy beginning Fall of 2013 all thesis credits must now be taken as S/U, Satisfactory/Unsatisfactory. A grade of “U” will not be factored into the graduate GPA, and therefore will not affect academic standing, but this still suggests failure to meet requirements for the degree. Additionally, a grade of F0

Pay careful attention to format, page numbering and spacing requirements specified by the graduate school. Details and additional information are available on the Grad School website: <https://www.unr.edu/grad/student-resources/filing-guidelines>

## **VII. Requirements for Graduate Degree Programs Conferred through MME**

### **Ph.D. in Mineral Resources Engineering**

**Required coursework:** Aside from MINE 790 and 795, there are no mandatory core courses specified for the Ph.D. degree in Mining and Metallurgical Engineering at this time. Recommended course work is laid out in the Program of Study designed by the Advisory/Examination Committee on an individual basis.

### **M.S. Mining Engineering**

**Required coursework:** Aside from MINE 790 and 795, there are no mandatory core courses specified for the M.S. degree in Mining Engineering. Students admitted to this program from Bachelor of Science degrees that are non-engineering related are expected to make up the following undergraduate course deficiencies as a minimum: ME 241 (statics), ME 242 (dynamics), ME 311 (thermodynamics), and MINE 350 (fluid mechanics). Additionally, a student's examination committee may recommend that the third semester of calculus and a course on differential equations be added as deficiencies. Moreover, all M.S. students are encouraged to take at least one course from each of the mining and metallurgical engineering faculty for purposes of broadening knowledge of the engineering discipline. Students have two-degree options: Plan A (thesis) and Plan B (non-thesis). Students opting for Plan B are required to pass the Comprehensive Exam (MINE 795).

### **M.S. Metallurgical Engineering**

**Required coursework:** Aside from MINE 790 and 795, there are no mandatory core courses specified for the M.S. degree in Metallurgical Engineering. Students admitted to this program from Bachelor of Science degrees that are non-engineering related are expected, at a minimum, to make up the following undergraduate course deficiencies: ME 241 (statics), ME 311 (thermodynamics), and MINE 350 (fluid mechanics). Additionally, a student's examination committee may

## **How do I apply?**

Applicants are strongly encouraged to contact prospective faculty advisors to discuss their interests

submission. Requests for research assistantships must be submitted directly to the corresponding professors in the department.

## **Who to contact?**

### **Mining and Metallurgical Engineering Department**

Phone (775) 784-6961

Fax (775) 784-4594

Email [mme@unr.edu](mailto:mme@unr.edu)

### **Ph.D. (Mineral Resource Engineering) Program Director:**

Charles Kocsis, Ph.D.

Associate Professor

(775) 784-6989

[kkocsis@unr.edu](mailto:kkocsis@unr.edu)

### **M.S. (Mining Engineering) Program Director:**

TBA

### **M.S. (Metallurgical Engineering) Program Director**

Carl Nesbitt, PhD

Associate Professor

(775) 784-8287

[carln@unr.edu](mailto:carln@unr.edu)

**Course requirements for all graduate programs will be listed in our graduate catalogue.**

## **What Are the other Program Requirements?**

The following deficiencies must be made up by non-mining engineering students entering the M.S. Degree program in Mining Engineering or the Ph.D. program in geo-engineering (mineral resources engineering) unless a special exception is approved jointly by the respective adviser, program director and department chair.

1. Students who have a B.S. degree in a physical science or other fields (e.g., geology, physics, chemistry, economics, etc.), must:
  - o pass the Fundamentals of Engineering (FE) exam, or satisfactorily complete (i.e., with a cumulative B average) a minimum of 12 credits of basic engineering courses to have a reasonable chance of passing the FE (e.g. this requirement can be met taking courses such as Statics, Dynamics, Strength of Materials, Fluid Mechanics, Thermodynamics, Electricity).

- have an adequate preparation in geology, i.e. a minimum of 6 credits in geology, taken from GEOL 211, GEOL 332, GEOL 385, or equivalent.
  - have basic mining knowledge, e.g., a course in mining methods or broad varied industrial mining experience, and, prior to or as part of the graduate program, no fewer than 6 credits of mining engineering classes.
2. Students, who have a B.S. degree in Engineering from an accredited or equivalent engineering school, must:
- have an adequate preparation in geology, i.e. a minimum of 6 credits in geology, taken from GEOL 211, GEOL 332, GEOL 385, or equivalent.
  - have basic mining knowledge, e.g., a course in mining methods or broad varied industrial mining experience, and, prior to or as part of the graduate program, no fewer than 6 credits of mining engineering classes.

### **What Would Be a Good Educational Schedule?**

Recommended schedule for M.S. Degree in Mining and Metallurgical Engineering

#### **First semester:**

1. Select Thesis advisor
2. Discuss program of study with Thesis advisor
3. Discuss possible thesis topics with Thesis advisor

#### **Fourth Semester:**

#### **Second semester:**

1. Select Advisory/Examining committee
2. Prepare thesis proposal
3. Thesis proposal. Hold first committee meeting to defend proposal and obtain approval for Program of Study from committee.
4. Begin thesis research
5. Submit Program of Study to Graduate School

*Annual Progress Report due April 15<sup>th</sup>*

#### **Third semester:**

1. Graduate seminar (MINE 790)

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Recommended schedule for Ph.D. Degree (entering with M.S.)

**First semester:**

1. Select Dissertation advisor
2. Discuss program of study with Dissertation advisor
3. Discuss possible Dissertation topics with advisor
4. Select 2 additional departmental members for Advisory/Examining committee

**Second semester:**

1. Graduate seminar (MINE 790)
2. Finish selecting Advisory/Examining committee

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Recommended schedule for Ph.D. Degree (entering without M.S.)

**First Semester:**

1. Select Dissertation advisor
2. Discuss program of study with Dissertation advisor
3. Discuss possible Dissertation topics with advisor

**Second semester:**

1. Graduate seminar (MINE 790)
2. Select Advisory/Examining committee
3. Prepare dissertation proposal outline
4. Hold first committee meeting; take qualifying exam, obtain approval for classes, proposal, and Program of Study from committee

*Annual Progress Report due April 15<sup>th</sup>*

**Third semester:**

1. Graduate seminar (MINE 790)
- 2.