



Department of
MINING ENGINEERING
THE UNIVERSITY OF UTAH

Graduate Student Handbook

Department of Mining Engineering

Salt Lake City, Utah

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UNIVERSITY OF UTAH

Department of Mining Engineering

Graduate Student Manual

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INTRODUCTION

Congratulations on joining the Mining Engineering Department at the University of Utah. The faculty and staff hope that your stay will be a challenging, rewarding and enjoyable experience. We expect that the new tools, techniques and skills you develop and the knowledge you gain during your stay will help you meet the exciting demands of a minerals industry career in the 21st century. This Handbook has been prepared to assist you in your transition to a mining engineering graduate student.

A Note of Caution: Although every effort has been made to assure that this Handbook is correct in every respect, the information contained is not intended to modify degree requirements promulgated by the Graduate School of the University of Utah. Their requirements are specified, in detail, in the University of Utah General Bulletin located on the web. Any inconsistencies between what is contained in this Handbook and the stated University requirements should be resolved with the Department's Graduate Program Director to ensure communication of the most up-to-date information.

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Department of Geology and Geophysics
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Department of Metallurgical Engineering
412 William Browning Building (WBB), (801) 581-6386

Department of Meteorology
812 William Browning Building (WBB), (801) 581-6136

University of Utah:

Graduate School, 310 Park Building, (801) 581-6925
Registrar's Office, 250 Student Services Building, (801) 581-5808
International Center, 159 Union Building, (801) 581-8876
Thesis Editor, 208 Building 44, (801) 581-8893
Graduate Records, 225 Building 44, (801) 581-6923
Graduate Admissions, 250 SSB, (801) 581-7283

GENERAL INFORMATION

Degree Programs:

The Department offers the M.S. (Thesis Option), M.E. (Engineering Report Option), and Ph.D. Degrees in mining engineering. The Department of Mining Engineering also participates in an interdisciplinary program offering M.E., M.S., and PhD degrees in Environmental Engineering.

Areas of Specialization:

Rock mechanics, mine ventilation, mine systems, underground mine planning and design, surface mine planning and design, coal mine planning and design, and rock blasting.

FINANCIAL ASSISTANCE

Opportunities for financial assistance are available in the Department to qualified students. This assistance takes the form of scholarships, research assistantships, fellowships, and hourly employment.

Graduate Scholarships: Full scholarship support is \$17,000 per year plus academic-year tuition, subject to tuition benefit limitations as outlined below. This support is only awarded for a full 12-month commitment and is distributed monthly. Those students receiving support during the summer are expected to be working on their research and/or taking courses on a full time basis. (Support amounts are subject to change on a yearly basis.)

Some scholarships are limited to U.S. citizens or students who have completed undergraduate degrees from U.S. institutions. This is currently the case with Browning Scholarships, with the exception of students who are receiving 50% or more funding from other sources, preferably research grants provided by off campus organizations or companies. Upon completion of one year of graduate work in the department, Browning scholarships may be made available to international students. Cooper-Hansen graduate scholarships are available to all students, including first-year international students.

Research Assistantships: Research assistants include all graduate students assigned directly to funded research projects. They are selected by the principal investigator of the project. Full research contract/grant support is \$17,000 per year plus academic year tuition. Those students receiving support during the summer are expected to be working on their research and/or taking courses on a full time basis. In general, students working on research contracts are expected to spend, on average, 20 hours per week during the academic year involved with their research project. This increases to a minimum of 40 hours per week during the summer. Unless specified by the grant, there are no citizenship restrictions for stipends and scholarships provided by faculty generated grants. (Support amounts are subject to change on a yearly basis.)

Support Continuation: Continuation of support is not automatic. It depends both upon the availability of funds and the progress toward a degree by the student. Assessment of progress will be made every 6 months by the advisor and the supervisory committee. It should be noted that graduate studies should not be likened to a normal job. Graduate studies are an important stepping stone in a career path and hence normal "personal" time should also be devoted to achieving the level of excellence expected by the Department and the University. If the student's

performance is not satisfactory, financial support will be discontinued. Financial support may be extended on a yearly basis within the guidelines of the Graduate School, upon mutual agreement of the student, the project director and the department head. Tuition and Scholarship supports can be extended a maximum of four academic semesters for M.S. studies and six academic semesters for PhD studies. Students receiving full scholarship and tuition benefits are encouraged to complete their studies within these time limits.

Summer Tuition: Tuition benefits are not paid during the summer for Graduate Assistantships or Fellowships graduate students are responsible for making this tuition payment themselves if they take courses during the summer. The tuition is assessed at the in-state rate. Research Assistants do have their summer tuition covered by the Tuition Benefit Program. The student must register for 3 hours of thesis credit.

Outside Employment: As indicated, those students receiving full scholarship or grant support are expected to devote full-time effort to attending classes and research during the entire year. Outside employment is not normally permitted. Occasionally, such work is directly related to the student's program of study and provides essential training and/or information related to the thesis subject. In this case, limited outside employment may be permitted with the consent of the Supervisory Committee Chair and the Department Chair. Occasional outside work (consulting, for example) must also be approved by the Committee Chair and the Department Chair.

Outside employment will be allowed for students who are not receiving full scholarship/research contract benefits. Suitable arrangements will be negotiated on an individualized basis provided they are consistent and fair with respect to other students. These arrangements should be in writing and added to the students file.

Practical Training for Foreign Students: Curricular Practical Training (CPT) and Optional Practical Training (OPT) are two short-term employment programs designed to provide foreign students with an opportunity to gain actual experience in their profession. Students may apply for a CPT during summer or after completion of course work requirements but before graduation. OPT is mainly for graduate students who are interested in post graduate work.

Students on scholarship and research assistantship are encouraged to apply for a CPT after completing their course work. However, to obtain a letter of recommendation, the student must demonstrate quality performance with his/her advisor and that the employment is appropriate and related to his/her thesis.

A student applying for an OPT should have completed a successful thesis defense and that a revised draft of his or her thesis be submitted to the thesis editor. These requirements must be met prior to the issuing of the OPT letter.

Vacation Periods: During the academic year (nominally August 16 – May 15) the graduate students are expected to be on campus. They must be on campus prior to the start of classes each semester. Permission for being away from campus during the semester break and Spring Break, as well as short periods during the summer, must be approved in advance by the advisor. The chances of permission approval are enhanced by extra effort expended prior to and after such periods of absence.

Office Hours: Unless other arrangements have been made, the graduate students are expected to be on campus and available during normal office hours (8 A.M. – 5 P.M. from Monday through Friday).

GENERAL DEPARTMENTAL POLICIES

Student Offices: Each graduate student is entitled to a desk which will be either in a common graduate student study area or in a research laboratory. Students are expected to establish regular office hours consistent with the wishes of the respective Chairs of their Supervisory Committees.

Keys: Graduate students will be provided keys to the building and their office or lab door. Keys must be surrendered at the time of departure from the University. Keys are not to be loaned out or transferred to other students.

Mailboxes: Each student will be provided a mailbox for deposit of campus and federal mail as well as messages from faculty and staff. The box is located in the Department office. Students are to check their boxes daily. This is the primary method of communication. In addition, each graduate student will be provided an EMAIL account, and is expected to check for messages, on a routine basis. Each student is to discuss the preferred method of communication with his or her Supervisory Committee Advisor.

Graduate Student Representative on the Departmental Student Advisory Committee (SAC): One student is to be selected by secret ballot to represent and serve on the SAC on an annual basis. The election must be completed by the end of Spring Semester, and the individual thus selected will serve for one year. A given representative may serve for multiple terms. This individual may serve as the ombudsman for graduate students when dealing with the faculty and Department Chair. The individual is also to assist with course evaluations and faculty reviews in concert with the Undergraduate SAC Representative. The representative may form committees of graduate students to discuss matters of common interest and obtain input for course and faculty reviews.

Telephone: Graduate students will be provided access to a telephone. Normally, phones will be limited to local calls. If long distance capability is needed for research work, an access number can be provided, assuming that research funds are available to cover charges. Arrangements should be discussed with Chair of the Supervisory Committee (Research Advisor).

Purchasing: All purchases for research projects and office supplies must be approved in advance. Appropriate forms are available in the office. Students should avoid making purchases with their own funds and later requesting reimbursement.

University Vehicles: Travel required as part of the research experience or other educational experiences may require use of University vehicles. If so, students must have a valid and current driver's license, current automobile insurance, and must complete the University approved safety training. Vehicles are not to be used for personal use or for transporting non-University personnel without specific approval.

Travel: All travel in conjunction with research or course work for which reimbursement is expected must be approved in advance. The appropriate forms are available in the department office. These forms must be approved by the student's research advisor and the Department Chair. All airline tickets and vehicle rentals must be arranged by the office staff.

Department Library: The department maintains a collection of current journals and magazines as well as selected reference books. These items as well as past thesis and dissertations are available for student use provided they are not removed from the library. Any exceptions must be approved by the staff person in charge of the library.

PC Labs and Usage: PCs are available in most research laboratories. In addition, graduate students may use computers in rooms WBB 107, WBB 108 and WBB 314 provided this use does not conflict with scheduled courses that may be using these facilities as a teaching aid. Access to these labs is by card reader using University ID cards. Activation requests are to be submitted to the office staff. In addition, each student is to have an account on the local server. This may also be done by submitting a request to the office staff. Students are not to install software or make modifications on the machines in these teaching labs without authorization from the Department Chair. Violation of these conditions may result in losing access to the facilities.

Some computers available to graduate students are connected to the internet. Use of these machines is to be restricted to research and course work only. Public and private funds are used to provide these facilities for academic purposes. Accessing and downloading inappropriate materials may result in removal of internet link. Consequently, it is in the best interest of all students to discourage inappropriate use.

Laboratory Safety: All students are required to have training in the use of laboratory equipment and supplies. This training is the responsibility of the faculty member in charge of the research laboratory and/or the Research Advisor. If such training is not offered, it is the responsibility of the student to request such training before use of the equipment. Students are to wear appropriate safety equipment (safety glasses, hearing protection, and protective clothing) in all laboratories in which there are risks of contact with irritants, flying fragments or loud noises. Field work will require all mandated safety gear (hard hats, armored footwear, safety glasses, and emergency breathing apparatus.) MSHA training may be needed for such activities. Students are to discuss these needs with their research advisor. Each laboratory has a list of safety rules as well as Material Safety Data Sheets (MSDS) for potentially harmful substances.

GENERAL ACADEMIC POLICIES

Minimum Admission Requirements:

1. An undergraduate GPA of at least 3.0 based on all undergraduate work or work completed during the last two years of undergraduate study, whichever is higher.
2. A B.S. degree in mining engineering (or equivalent) from an accredited college or university.
3. If the applicant is not from an English-speaking country a Test of English as a Foreign Language (TOEFL) score of 173 (500 Paper based) or better obtained within the past two years is required.
4. Submission of GRE scores **is recommended** but not required for M.S. & M.E. applicants
The GRE exam **is required** for Ph.D. applicants.
5. Favorable recommendation of the mining department faculty.

Student Rights and Responsibilities

All students must be aware that the University upholds strict standards of academic conduct.

Section 1.B., Paragraph 2 of the Student Code states: "Academic misconduct" includes, but is

not limited to, cheating, misrepresenting one's work, inappropriately collaborating, plagiarism, and fabrication or falsification of information, as defined further below. It also includes facilitating academic misconduct by intentionally helping or attempting to help another to commit an act of academic misconduct."

The Student Code also contains a section on professional misconduct related to engineering ethics. Students are encouraged to review the Student Code, which can be found at

<http://www.admin.utah.edu/ppmanual/8/8-10.html#SECTION%20I>:

to ensure that they understand the definitions of these possible infractions.

The Mining Engineering Department expects all students to observe the Student Code, and will take appropriate action when violations are discovered.

GENERAL ACADEMIC PROCEDURES

Selection of a Thesis Topic and Advisor

In some cases, the incoming graduate student may have already selected a thesis topic and an advisor prior to arriving on campus. If this is the case, then directly upon arriving on campus the student will meet with his/her advisor to select the course program for the semester.

In some cases, the thesis topic will not have been selected prior to the student's arrival on campus. In this case, the Director of Graduate Studies will meet with the student and organize meetings with each of the professors. The purpose of these meetings will be to identify potential topics of common interest leading to the selection of both a topic and advisor. During the time leading up to the identification of an advisor, the Director of Graduate Studies will serve as the student's advisor on an interim basis. Thesis topic and advisor selection should occur during the first semester on campus.

It is very important the thesis topic and the advisor be carefully selected to maximize the possibility for success. For the Ph.D. students this is especially important. The Ph.D. thesis requirement is that the student must eventually produce and present a significant, original contribution to the technical or scientific literature. A logical first step is to conduct an extensive review of the literature to identify the proposed contribution and its significance.

Thesis Committee Selection

The advisor and the student in consultation recommend members who will serve on the students committee. This should be done as early as possible in the process. In general, there are three members of an M.S. committee (two from the mining department) and 5 members of a Ph.D. committee (three members from the mining department). These members are generally professors from whom the student has taken courses and who are familiar with the thesis topic. An adjunct faculty member may serve as a member of a graduate committee but not as chair unless specifically approved by the Dean of the Graduate School. The committee is to act as a sounding board for ideas and to provide advice during the duration of the thesis. Eventually they will judge the quality of the work presented and be asked to attest that it satisfies the required standards. The thesis committee selection should occur during the second semester on campus. The nominations are then forwarded to the Dean, College of Mines and Earth Sciences, for approval.

Make-up Courses for Graduate Degrees in Mining Engineering

Substitution of experience or elimination of unnecessary courses is to be decided by the supervisory committee.

Students with a B.S. in another engineering discipline*

Complete three of the following courses:

- MG EN 5010 Underground Mining Methods
- MG EN 5020 Surface Mining Methods
- MG EN 5050 Mine Ventilation
- MG EN 5160 Rock Mechanics Applications

Complete one of the following courses:

- MG EN 3400 Mine Surveying
- MG EN 5080 Mine Permitting and Reclamation
- MG EN 5170 Mine Administration and Finance
- MG EN 5340 Mineral Evaluation

Completion of MG EN 3400 requires completion of MG EN 2400, Introductory Surveying, or equivalent

Completion of MG EN 5160 requires completion of MG EN 5150, Mechanics of Materials, *and the associated lab*, or equivalent

Students must also complete

- GEO 3060 Structural Geology and Tectonics
- GEO 3075, Rock and Mineral Identification

Students without a B.S. in any engineering discipline*

In addition to the above, complete the following courses:

- CHEM 1210, 1211
- MATH 1210, 1220, 2210, 2250
- PHYS 2210, 2220
- CVEEN 2110, Statics, or equivalent
- MG EN 2400 Introduction to Surveying
- MG EN 5060 Thermodynamics or equivalent
- MG EN 5320 Hydraulic Systems or equivalent

or receive a passing grade on the Fundamentals of Engineering Exam

Students “without a B.S. in any engineering discipline” cannot receive fellowship funding while completing make-up courses.

*Courses taken to satisfy the above make-up requirements will not satisfy the coursework requirements for graduate degree programs.

Registration

Registering for Classes: Graduate students should use the registration system available on the Internet to secure their classes. Registration materials and an assigned time to register are mailed to students 6-8 weeks before the beginning of the semester. It is the responsibility of each student to register during his specified time. The student is responsible for the payment of any late registration fees. If the student does not register before the census date (usually two weeks into the semester) the tuition benefit is lost and student will be required to pay all tuition charges.

Students completing research and dissertation writing and no longer taking courses are required to take at least three (3) credit hours each semester, including the summer term.

Summer Semester Registration: Continuous registration refers only to registration during the regular academic year and is not interrupted by non-registration during the summer months. However, students must maintain registration during the summer if a) they are receiving financial support from the Department; b) if examinations are scheduled for that time; or c) if they are utilizing laboratory facilities in the department.

Holds on Student Records: A hold is placed on a student's record for failure to meet University obligations (outstanding fees, academic standards, etc.). The University withholds registration privileges, diplomas, and copies of academic records and transcripts, or information pertaining to them, until all obligations are met.

Full-Time Status: Graduate students are considered full-time if 1) they are registered for nine or more credit hours; or 2) after the residency requirement has been met, registration for three credit hours of MG EN 6970, 6980, 7970, 7980. Note that Option 2 does not fulfill state residency requirements, and tuition for these courses is at the in-state rate provided no other courses are registered for during the semester. Students receiving department scholarships are expected to register for 12 credit hours in both Fall and Spring Semesters.

Maximum Hours: During Fall and Spring semester, Graduate Assistants and Graduate Fellows can register for a minimum of 9 credits and a maximum of 12. Research Assistants can register for a minimum of 9 credits and a maximum of 11. A schedule of nine course hours plus three thesis hours is considered a full load for both master's and doctoral candidates.

Note: All University requirements, such as ID cards, health insurance proof, proof of immunizations, etc., must also be met.

ACADEMIC DEGREE PROGRAM DESCRIPTION

Master of Science (M.S.)

Description: The Master of Science degree is a research-oriented postgraduate study of the mining engineering discipline beyond the B.S. degree. It requires competence in research and an understanding of related subjects. The M.S. degree (Thesis Option) is required of all students who might want to be eventually considered for admittance to the Ph.D. program.

Program of Study: The total semester hour requirement for the M.S. degree is 30 credit hours. At a minimum, M.S. candidates must complete 12 credit hours in their major field (including 1 credit hour of graduate seminar (MG EN 7800)), and 8 hours in allied subjects. The remainder of the hours (the difference between the required 30 hours and the course hours taken) is supplied by taking "Thesis Hours". A minimum of 10 hours of "Thesis Research: Masters" must be included in the program of study. A typical program might be

MAJOR:	12 credit hours
ALLIED:	8 credit hours
THESIS:	10 credit hours

It is normally expected that an entering M.S. degree candidate holding a B.S. degree in mining engineering from an accredited program should be able to complete all degree requirements in three semesters (including one summer). This includes completing the course work (courses numbered 5000 and higher), conducting the research and writing and defending the thesis. It should be noted that a maximum of 20 course credit hours can be applied from the M.S. program toward the Ph.D. The student must sign up for 12 credit hours each semester. The difference between the actual course credit hours and the 12 credit hours is made up by thesis hours. Even though many more thesis hours than 10 may have been taken during the program, only 10 thesis credit hours should appear on the graduation form. It should be noted that credits taken under the title "Faculty Consultation MG EN 6980" do not count toward thesis hours or fulfillment of degree requirements. Occasionally courses will have a 5000 level and a 6000 level. All graduate students are to register for the 6000 level course. Courses required for the B.S. degree in mining engineering cannot be counted towards the M.S. degree. The candidate is required to maintain a 3.0 or higher GPA in course work listed on Application for Admission to Candidacy for the Master's Degree. A grade below C is not accepted toward a graduate degree.

Supervisory Committee: The committee generally consists of three faculty members, two of whom must be faculty in Mining Engineering. One member of the committee is to be appointed from another department. Adjunct faculty may serve on committees. This committee should be appointed no later than the first semester of graduate work and the appropriate form filed with the Graduate Records Office. This and other forms are available from the Graduate School website, http://www.utah.edu/graduate_school/forms.html. The supervisory committee is responsible for approving the student's academic program, preparing and judging the comprehensive examination, approving the thesis subject and the thesis itself, and administering and judging the final oral examination (thesis defense). If a supervisory committee finds a graduate student's preparatory work deficient, the student may be required to register for

and complete supplementary courses that do not carry graduate credit or do not count toward the degree program.

Thesis Proposal: All M.S. candidates are encouraged to prepare a formal written thesis proposal for presentation to, discussion of, and acceptance by the Supervisory Committee. This should be done early in the student's program, preferably during the first semester in residence. An oral version of the thesis proposal should be presented at the Graduate Seminar. This presentation will help inform others in the Department as to the nature of the work being done as well as provide an opportunity for input from faculty and students, along with practice in oral presentation. This input may be of considerable value during the initial stages of a student's research work.

Registration: Students must maintain full-time consecutive registration until the thesis defense has been completed. A leave of absence may be requested from the advisor and must be approved by the Department Chair. (Note - a leave of absence is usually not approved unless it results from conditions beyond the student's control). Failure to maintain full-time consecutive registration may result in the student's having to re-apply for admission.

Residency: At least 1 year (two consecutive semesters) of the master's program must be spent in full-time academic work at the University of Utah. This is considered to include a minimum of 24 credit hours.

Application for Candidacy: During the second semester of graduate work, the student should complete the "Application for Admission to Candidacy" form (see the Graduate School website). This should then be submitted to the supervisory committee for review and approval. It is then forwarded to the Director of Graduate Studies, the Department Chair, and the Dean of the College of Mines and Earth Sciences for their approvals. The form is then forwarded to the Graduate Records Office. This form is due in Graduate Records no later than one semester prior to graduation and no earlier than one year before graduation.

Graduate Seminar: Every graduate student is expected to register for Graduate Seminar (MG EN 7800) each semester while in residence. Two formal seminar presentations must be made as part of graduation requirements, one seminar to introduce the student's proposed research topic and one in preparation for thesis defense. A total of one credit for MG EN 7800, Graduate Seminar, is to be included as part of the degree program. It is suggested that the first presentation be made early in the program to mining engineering faculty, graduate students, and interested undergraduates. Preferably this will be on the basis of the thesis proposal. The second presentation is usually scheduled just prior to the Final Oral Examination (Thesis Defense) and serves as a good opportunity for practice. Students may be asked to give additional seminar presentations at the request of graduate seminar coordinator. All graduate students are expected to attend every Graduate Seminar presentation unless prior arrangements are made with the coordinator.

Comprehensive Examination: Every M.S. student is required to take a comprehensive examination conducted by the Supervisory Committee. This examination may be either written or oral. It is to be taken upon completion of essentially all course work and is to be focused upon that work. The examination is not to be combined with the thesis defense (Final Oral Examination).

The Thesis Requirement: As part of the M.S. degree, each candidate must submit a thesis on an approved research topic. The thesis should represent a minimum of 10 credit hours of work.

Thesis Preparation: The Mining Engineering Department requires that theses follow the SME Book Publishing Style Guide (see: www.smenet.org). This format is registered with the thesis and dissertation editor, who approves individual theses in accordance with the departmental and Graduate School policy. The student should submit the draft thesis to his or her advisor at least 3 weeks prior to proposed date for the final oral examination (thesis defense). The advisor will then thoroughly review the thesis for content, accuracy, logic flow, grammar, style, etc. Only after the draft has been read and approved by the thesis advisor should it be distributed to the rest of the committee. The thesis committee members must then be given a minimum of 2 weeks to read the advisor-approved draft. Comments from the Committee members may require modifications to be made.

Thesis Presentation and Thesis Defense: When the Committee agrees that the thesis is suitable for presentation and defense, the place and time are selected. The time and place should be publicly announced (posted) at least 2 weeks prior to the presentation. The student will generally make a short presentation covering the major aspects of the thesis work. This is generally of the order of ½ hour. The floor is then open for questions from the audience and general questions from the committee. The audience is then thanked for coming and excused. At this point, a detailed examination of the thesis and the thesis topic will be conducted by the members of the supervisory committee. To receive the M.S. degree, the candidate must be able to successfully defend his or her thesis.

Thesis Printing and Binding: Students are required to satisfy all editorial changes made by the Thesis Editor. Particular attention must be paid to generating printable figures and tables. Line weights, shading, and font sizes all need to be clear and readable. A minimum of three bound copies must be provided. If the student and advisor wish to have personal copies, the student or advisor must make arrangements for payment for these copies in addition to the three required by the University.

Time Limit: All work for the M.S. degree must be completed within four consecutive calendar years.

Doctor of Philosophy (Ph.D.)

Description: The Doctor of Philosophy degree is awarded for high achievement in an advanced specialized field of study. It requires demonstrated competence in independent research and an understanding of related subjects. The Ph.D. thesis requirement is that the student's work must be considered to be a significant, original contribution to the technical or scientific literature. A logical first step is to conduct an extensive review of the literature to identify the proposed contribution and its significance.

An M.S. degree is required for admittance into the PhD program.

Program of Study: Ph.D. candidates must complete 30 course credit hours in their major field and 18 course credit hours in allied subjects for a total of 48 course credit hours. A minimum of 22 hours of "Thesis Research: Ph.D" must be included in the program of study. A typical program might be

MAJOR:	30 course credit hours - or 18 hours beyond the M.S. degree
ALLIED:	18 course credit hours - or 10 hours beyond the M.S. degree
THESIS:	22 thesis credit hours - thesis credit hours taken as part of an M.S. program do not count towards the Ph.D. degree

All Ph.D. candidates are required to satisfy the foreign language requirement as described under the heading "Language Requirement". Twenty course credit hours taken as part of the M.S. degree may be counted towards the required course work for the Ph.D. program of study. The student must include one credit of Graduate Seminar (MG EN 7800) taken while a Ph.D. student in his program. If a supervisory committee finds a graduate student's preliminary work deficient, the student may be required to register for and complete supplementary courses that do not carry graduate credit. Courses required for a B.S. degree in mining engineering cannot be counted toward a graduate degree in this major. The student must sign up for 12 credit hours each semester. The difference between the actual course credit hours and the 12 credit hours is made up by thesis hours. Even though many more thesis hours than 22 may have been taken during the program, only 22 thesis credit hours should appear on the graduation form. It should be noted that credits taken under the title "Faculty Consultation MG EN 6980" do not count toward thesis hours or fulfillment of degree requirements. All candidates must file the *Program of Study* form with the Graduate Records Office (see the Graduate School website). This form, which lists course work and research hours, is due one semester before graduation and no earlier than one year before graduation.

The candidate is required to maintain a 3.0 or higher GPA in course work listed on Application for Admission to Candidacy for the Master's Degree. A grade below C is not accepted toward a graduate degree.

Supervisory Committee: Committees generally consist of five faculty members, the majority of whom must be faculty in the student's major department (Mining Engineering). Adjunct faculty may serve on supervisory committees. Normally, two members of the committee are appointed from another department. The supervisory committee is responsible for approving the student's

academic program, preparing and judging the qualifying examinations, approving the dissertation subject and completed dissertation, and administering and judging the final oral examination (dissertation defense).

Language Requirement: To satisfy the language requirement the student must either (a) pass the standard proficiency examination, or (b) complete a second semester language course with at least a B grade. Qualifying languages include Spanish, French, German, Russian, or another language approved by the student's graduate committee in which a significant amount of mining literature appears. If the student is already fluent in such a qualifying language, the student's committee may at its discretion certify that the language requirement is satisfied. See http://www.utah.edu/graduate_school/graduate_handbook/language.html for details.

Graduate Seminar: Every graduate student is expected to register for Graduate Seminar (MG EN 7800) each semester while in residence. Two formal seminar presentations must be made as part of graduation requirements, one seminar to introduce the student's proposed research topic and one in preparation for thesis defense. A total of one credit for MG EN 7800, Graduate Seminar, is to be included as part of the degree program. It is suggested that the first presentation be made early in the program to mining engineering faculty, graduate students, and interested undergraduates. Preferably this will be on the basis of the thesis proposal. The second presentation is usually scheduled just prior to the Final Oral Examination (Thesis Defense) and serves as a good opportunity for practice. Students may be asked to give additional seminar presentations at the request of graduate seminar coordinator. All graduate students are expected to attend every Graduate Seminar presentation unless prior arrangements are made with the coordinator.

Residency Requirement: At least 1 year (two consecutive semesters) of the doctoral program must be spent in full-time academic work at the University of Utah. Continuous registration is required for the full duration, however.

Registration Requirement: Students must maintain full-time consecutive registration until the dissertation defense has been completed. A leave of absence may be requested from your advisor and must be approved by the Department Chair. Failure to maintain full-time consecutive registration may result in the student having to reapply for admission. Once the residency requirement has been fulfilled, the continuous registration requirement can be satisfied by registering for either (a) 3 hours of "Thesis Research: Ph.D." MG EN 7970, or (b) 3 hours of "Faculty Consultation" MG EN 7980.

Qualifying Examination: Written and oral qualifying (preliminary) examinations are required of each student. The exams cannot be scheduled until after 90% of the course work has been completed. Examinations are usually prepared, administered, and evaluated by the student's supervisory committee. An examination or parts of an examination may be repeated only once and only at the discretion of the student's supervisory committee. The written examination is given first. If this exam is satisfactorily completed, the oral examination may then be scheduled. Although the maximum time between the exams is 1 month, the student is encouraged to schedule the oral examination as quickly as possible.

Dissertation: The candidate must submit a dissertation embodying the results of engineering research. The dissertation must provide evidence of originality and the ability to complete independent investigation and must be a significant contribution to knowledge in the field. The dissertation must show a mastery of the relevant literature and be presented in an acceptable style.

Dissertation Mechanics: The Mining Engineering Department requires that dissertations follow

the SME Book Publishing Style Guide. This format is registered with the thesis and dissertation editor, who approves individual dissertations in accordance with the departmental and Graduate School policy. The student should submit the draft thesis to his or her advisor at least 6 weeks prior to the proposed date for the final oral examination (thesis defense). The advisor will then thoroughly review the thesis for content, accuracy, logic flow, grammar, style, etc. Only after the draft has been read and approved by the thesis advisor should it be distributed to the rest of the committee. The thesis committee members must then be given a minimum of 3 weeks to read the advisor-approved draft. Comments from the Committee members may require modifications to be made.

Thesis Presentation and Thesis Defense: When the Committee agrees that the thesis is suitable for presentation and defense, the place and time are selected. The time and place should be publicly announced (posted) at least 2 weeks prior to the presentation. The student will generally make a short presentation covering the major aspects of the thesis work. This usually lasts about 30 minutes. The floor is then open for questions from the audience and general questions from the committee. The audience is then thanked for coming and excused. At this point, a detailed examination of the thesis and the thesis topic will be conducted by the members of the supervisory committee. To receive the PhD degree, the candidate must be able to successfully defend his or her thesis.

Thesis Printing and Binding: Students are required to satisfy all editorial changes made by the Thesis Editor. Particular attention must be paid to generating printable figures and tables. Line weights, shading, font sizes all need to be clear and readable. A minimum of three bound copies must be provided. If the student and advisor wish to have personal copies, the student and/or advisor must make arrangements for payment for these copies in addition to the three required by the University.

Time Limit: All Ph.D. candidates must complete their programs within 5 years.

Master of Engineering (M.E.)

Description: The Master of Engineering (M.E.) is a non-thesis degree intended for those who wish to do pursue graduate studies beyond the B.S. degree but who are not interested in pursuing the research-oriented M.S. degree. As such, the M.E. is typically a terminal degree for professional engineers. Incoming students are expected to have a B.S. degree in mining engineering from an accredited program.

Program of Study: The total semester hour requirement for the M.E. degree is 30 credit hours. At a minimum, M.E. candidates must complete 12 course credit hours in their major field (Mining Engineering), 6 course credit hours in allied subjects, and 6 course credit hours in other areas approved by the supervising committee. A minimum of 6 hours of "Master of Engineering Project (MG EN 6970)" must be included in the program of study. A typical program might be

MAJOR:	12 credit hours
ALLIED:	6 credit hours
OTHER COURSES:	6 credit hours
ENGINEERING REPORT:	6 credit hours

Since no research work is included in the program, it is expected that the entering M.E. degree candidate holding a B.S. degree in mining engineering from an accredited program should be able to complete all degree requirements in two semesters plus one summer. The 24 credit hours of approved course work in engineering and allied fields must be completed with at least a 3.0 GPA. No grade below C is accepted toward the degree. All work must be completed within three calendar years.

Supervisory Committee: As with the M.S. degree, an advisor is selected with respect to the engineering report subject matter. A supervisory committee is appointed. This generally consists of two mining engineering faculty members and one from an allied area. This committee should be appointed as early as possible as but no later than the end of the first semester. The appropriate form (see Appendix A) is filed with the Dean's Office. The supervisory committee is responsible for approving the student's academic program, preparing and judging the comprehensive examination, approving the report subject and the report itself, and administering and judging the final report presentation. If a supervisory committee finds a graduate student's preparatory work deficient, the student may be required to register for and complete supplementary courses that do not carry graduate credit and/or do not count toward their degree program.

Report Proposal: All M.E. candidates are encouraged to prepare a formal written report proposal for presentation to and discussion/acceptance by the Supervisory Committee. This should be done during the first semester in residence. An oral version of the report proposal should be presented at the Graduate Seminar. This presentation will help inform others in the Department as to the nature of the work being done as well as provide an opportunity for input from faculty and students, along with practice in oral presentation.

Registration: Students must maintain full-time consecutive registration until the final report

presentation and the comprehensive examination have been passed. A leave of absence may be requested from the advisor and must be approved by the Department Chair. (Note - a leave of absence is usually not approved unless it results from conditions beyond the student's control). Failure to maintain full-time consecutive registration may result in the student having to reapply for admission.

Residency: At least 1 year (two consecutive semesters) of the M.E. program must be spent in full-time academic work at the University of Utah. This is considered to include a minimum of 24 credit hours.

Graduate Seminar: Every graduate student is expected to register for Graduate Seminar (MG EN 7800) each semester while in residence. Two formal seminar presentations must be made as part of graduation requirements, one seminar to introduce the student's proposed research topic and one in preparation for thesis defense. A total of one credit for MG EN 7800, Graduate Seminar, is to be included as part of the degree program. It is suggested that the first presentation be made early in the program to mining engineering faculty, graduate students, and interested undergraduates. Preferably this will be on the basis of the thesis proposal. The second presentation is usually scheduled just prior to the Final Oral Examination (Thesis Defense) and serves as a good opportunity for practice. Students may be asked to give additional seminar presentations at the request of graduate seminar coordinator. All graduate students are expected to attend every Graduate Seminar presentation unless prior arrangements are made with the coordinator.

Comprehensive Examination: Every M.E. student is required to take a comprehensive examination conducted by the Supervisory Committee. This examination may be either written or oral. It is to be taken at the end of all course work and is to be focused upon that work. The examination is not to be combined with the Report Presentation.

The Report Requirement: As part of the M.E. degree, each candidate must submit a report on an approved mining engineering topic. The thesis should represent a minimum of 6 credit hours of work.

Report Preparation: The Mining Engineering Department requires that the engineering reports follow the SME Book Publishing Style Guide. The student should submit the draft report to his/her advisor at least three weeks prior to the proposed date for the final report presentation. The advisor will then thoroughly review the report for content, accuracy, logic flow, grammar, style, etc. Only after the draft has been read and approved by the advisor, should it be distributed to the rest of the committee. The committee members must then be given a minimum of two weeks to read the advisor-approved draft. Comments from the Committee members may require modifications to be made.

Report Presentation and Report Defense: When the Committee agrees that the report is suitable for presentation and defense, the place and time are selected. The time and place should be publicly announced at least 1 week prior to the presentation. The student will generally make a short presentation covering the major aspects of the report work. This usually requires about 30 minutes. The floor is then open for questions from the audience and general questions from the committee. The audience is then thanked for coming and excused. At this point, a detailed examination of the report and the report topic will be conducted by the members of the supervisory committee. To receive the M.E. degree, the candidate must be able to successfully defend his or her report.

Report Printing and Binding: Particular attention must be paid to generating printable figures and tables. Line weights, shading, font sizes all need to be clear and readable. One bound copy

must be provided. If the student and advisor wish to have personal copies, the student or advisor must make arrangements for payment for these copies in addition to the one required by the University.

TIMELINE FOR GRADUATE DEGREES

The following tables indicate typical times required to reach the benchmarks of the three graduate degrees.

Milestones for M.S. and M.E. Students:

Table 1. M.S. and M.E. Degree Benchmarks

Objectives		Deadlines	
		M.S.	M.E.
1	Select an advisor and a thesis topic	1st semester	1st semester
2*	Form Supervisory Committee	End of 1st semester	End of 1st semester
3	Submit Program of Study, and get committee approval	Before end of 1st semester	Before end of 1st semester
4	Present first graduate seminar	Before end of 2nd semester	Before end of 2nd semester
5	Present research /engineering report proposal to the committee	2nd semester	2nd semester
6	Finish course work, and present second graduate seminar	Before end of 3rd semester	Before end of 3rd semester
7	Develop thesis/engineering report and prepare draft	3rd semester	3rd semester
8*	Submit "Application for Candidacy" (program of study)	3rd semester	3rd semester
9	Submit engineering report and pass written/ oral comprehensive examination		3rd semester
10*	Defend thesis and pass oral comprehensive examination	4th semester	
11	Make changes in thesis/engineering report required by supervisory committee	4th semester	4th semester
12	Submit duplicated copies of the thesis to the Thesis Editor	Before registrar's closing date for the semester	Before registrar's closing date for the semester

* Submit required form to Graduate Records http://web.utah.edu/graduate_school/Forms.html

Note: An M.S or M.E student to receive full scholarship is expected to complete all degree requirements in three semesters plus one summer semester.

Milestones for Ph.D. Students:

Table 2. PH.D. Degree Benchmarks

Objectives		Deadlines
1	Select an advisor and a thesis topic	1st semester
2	Prepare program of study and present first seminar	Before end of 1st semester
3*	Form Supervisory Committee	2nd semester
4	Conduct literature review	2nd semester
5	Present research proposal to the committee	Beginning of 3rd semester
6	Finish course work and present second graduate seminar	4 th semester
7	Pass Qualifying Examination (90 % of coursework complete)	4th semester
8*	Submit Program of Study for Ph.D. to Graduate Records	Beginning of 5th semester
9	Pass Language Proficiency Exam	5th semester
10	Develop thesis and prepare draft	5th and 6th semesters
11	Submit draft of dissertation	7 th semester, at least three weeks before oral examination
12*	Defend dissertation before committee	7th semester
13	Make changes in dissertation	7 th semester
14	Submit duplicated copies of dissertation to thesis editor copies	Before registrar's closing date for the semester

*: Submit required form to Graduate Records http://web.utah.edu/graduate_school/Forms.html

Note: A Ph.D. student to receive full scholarship is expected to complete all degree requirements in five semesters plus two summer semesters.

To stay on schedule, a graduate student should complete his or her program within the suggested timeframe. For specific deadline dates in any semester, see the Graduate School website.

GRADUATE DEGREE PROCEDURES ME, MS, PHD

Supervisory Committee

Consult with your advisor to select the committee members. When your committee is formed, contact Pam in the Mining Department Office to have your committee members entered and establish an **Electronic Graduate Record File** which is then approved by The Graduate School.

You can view your Electronic Graduate Record File by logging into Campus Information Systems (<http://cis.utah.edu>) and clicking on *Graduate Student Summary* under the *Graduate Student* section. More information on using CIS to view your Electronic Graduate Record File is available at http://www.gradschool.utah.edu/students/eqrf_student_tutorial.php

Program of Study

Your department coordinator will enter your **Program of Study** into your Electronic Graduate Record File. Your Supervisory Committee will then approve this Program of Study no later than 1 semester before graduation.

Applying for Graduation

Beginning in Fall 2010, all candidates for graduation must complete an **Application for Graduate Degree** with the Graduation Division of the Office of the Registrar.

Details about this application, including application deadlines and the required form, are available at <http://www.sa.utah.edu/regist/graduation/applying.htm>

Graduate School Protocol

Although your department coordinator will complete each of the following items in your Electronic Graduate Record File, you should be aware of the following deadlines to ensure graduation in a specific semester. (See next page)

If you have any questions about this protocol or whether your Electronic Graduate Record File has been completed by the given deadlines, please consult with your department coordinator.

Thesis Information

The [Thesis Office](#) has additional requirements to obtain a Thesis Release (required prior to graduation). An overview of these requirements and their deadlines, as well as information about electronic submission of theses and dissertations, format samples, and required forms, are available at <http://www.gradschool.utah.edu/thesis/index.php>

Questions regarding theses and dissertations should be directed to the Thesis Office.

Deadlines to Follow

SEMESTER OF GRADUATION	(a) SUBMISSION OF DEFENDED MANUSCRIPT FOR FORMAT APPROVAL	(b) COMPREHENSIVE EXAM (IF REQUIRED)	(c) LANGUAGE VERIFICATION (IF REQUIRED)	(d) NONTHESIS FINAL EXAM
Summer 2011	Jun. 17	Aug. 5	Aug. 5	Aug. 5
Fall 2011	Oct. 28	Dec. 16	Dec. 16	Dec. 16
Spring 2012	Mar. 16	May 3	May 3	May 3
Summer 2012	Jun. 15	Aug. 3	Aug. 3	Aug. 3

- a. Submitted by the student. Cannot be submitted before thesis has been defended.
- b. Entered by the department following the examination.
- c. Initiated by the student in the Department of Languages and Literature; entered by the Department of Languages and Literature.
- d. Entered by department after the examination.

Please Note:

1. For graduation within a given semester, all graduate program requirements must be completed and processed by the Graduate Records Office and Registrar's office **within two weeks following the published final examination period**. Students should view their electronic files online under the [Campus Information System](#) on the Grad Student Prog Plan Audit page (see [the EGRF tutorial](#) for details).
Deadlines for all requirements are clearly stated on The Graduate School website, and it is the student's responsibility to observe all deadlines and to check with his or her home department if anything on the Requirement Audit Tab is incomplete.
If any requirement is not met, the student must reapply for graduation in the following semester.
2. Each **department** should confirm the posting of student degrees **after each graduation**.

For further information regarding your Electronic Graduate Record File, please consult [this tutorial](#). Questions regarding your committee, graduate record, or graduation can be directed to Darci Berg at 801.585.9873 or darci.berg@gradschool.utah.edu.

Typical Program Schedule for a Student Seeking MS or ME Degree

	Scholarship (3 semesters + 1 summer)	Research Assistant (4 semesters + 2 summers)	Scholarship (3 semesters + 1 summer)	Research Assistant (4 semesters + 2 summers)
Fall	Full-time course work Select advisor / thesis topic Program schedule Develop thesis outline, submit to advisor Present first seminar (thesis proposal) Select committee	Courses / Research Project Select advisor / thesis topic Program schedule Develop thesis outline, submit to advisor Select committee		
Spring	Full-time course work Complete Literature Review	Courses / Research Project Complete Literature Review Present first seminar (thesis proposal)	Full-time course work Select advisor / thesis topic Program schedule Develop thesis outline, submit to advisor Select committee Present first seminar (thesis proposal)	Courses / Research Project Select advisor / thesis topic Program schedule Develop thesis outline, submit to advisor Select committee
Summer	Apply For Candidacy Work full-time on thesis	Thesis / Research CPT Option	Work full-time on thesis	Thesis / Research CPT Option
Fall	Rough draft of thesis to advisor Present second seminar Submit thesis to committee Defend Thesis Submit final version to editor	Complete coursework Thesis / Research	Full-time course work Apply For Candidacy	Courses / Research Project Complete Literature Review Present first seminar (thesis proposal)
Spring		Rough draft of thesis to advisor Present second seminar Submit thesis to committee Defend Thesis Apply For Candidacy	Rough draft of thesis to advisor Present second seminar Submit thesis to committee Defend Thesis Submit final version to editor	Complete coursework Thesis / Research
Summer		Submit final version to editor		Apply for Candidacy Thesis / Research
Fall				Rough draft of thesis to advisor Present second seminar Submit thesis to committee Defend Thesis Submit final version to editor