

**PETROLEUM ENGINEERING DEPARTMENT**  
**GRADUATE STUDENT HANDBOOK**



**COLORADO SCHOOL OF MINES**

**UPDATED January 2013**

## **Welcome to the Colorado School of Mines Petroleum Engineering Department!**

We are glad that you have chosen to conduct your graduate studies at the Colorado School of Mines. Our department has a rich and extensive history in providing quality alumni that contribute significantly to the petroleum industry. Your acceptance to the program indicates we feel that you have the capability and desire to contribute in your own way in the future.

- The Petroleum Engineering Department Faculty and Staff

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## **I. DISCLAIMER**

This Handbook is provided to graduate students in the Petroleum Engineering Department at the Colorado School of Mines (CSM). It is intended to help students navigate the process of obtaining their respective degree. It DOES NOT replace the school's Graduate Bulletin, but instead it is intended to provide supplemental, department specific information. Any topics that are discussed in both documents, the Graduate Bulletin information will always supersede this manual.

## **II. INTRODUCTION**

This Handbook is provided to graduate students in the Petroleum Engineering (PE) Department at the Colorado School of Mines (CSM) and is intended to aid new students in their transition into graduate school, as well as, assist all students toward the successful completion of their degree and associated requirements. As stated in the Disclaimer above, this Handbook supplements the CSM Graduate Bulletin. It is each graduate student's personal responsibility to read and understand the information pertaining to graduate studies in both this Handbook and in the Bulletin.

## **III. MISSION STATEMENT**

The Petroleum Engineering Department's Mission Statement is:

*To educate engineers for the worldwide petroleum industry at the undergraduate and graduate levels, perform research that enhances the state-of-the-art in petroleum technology, and to serve the industry and public good through professional societies and public service. This mission is achieved through proactive leadership in providing a solid foundation for both the undergraduate and graduate programs. Students are well prepared for life-long learning, an international and diverse career, further education, and public service. The program emphasizes integrated and multidisciplinary teamwork in classroom instruction and in research, and actively pursues interdisciplinary activities with many other CSM departments, particularly the Earth Science/Engineering programs.*

## **IV. LEGAL POLICY INFORMATION**

For Affirmative Action Policy, Unlawful Discrimination Policy and Complaint Procedure, Sexual Harassment Policy, Sexual Harassment Complaint Procedure, and Personal Relationships Policy, see the Policies and Procedures Section in the Graduate Bulletin.

## **V. ETHICS AND PROFESSIONALISM**

Both CSM and the Department have strict policies regarding ethics and professionalism. No unethical behavior or any type of academic dishonesty will be tolerated. As a graduate student in the PE Department, you are responsible for knowing and abiding by both CSM's and the Department's honor codes. The CSM Student Honor Code, developed and adopted by your fellow students, is as follows:

### **STUDENT HONOR CODE**

#### **Preamble:**

The students of Colorado School of Mines (Mines) have adopted the following Student Honor Code (Code) in order to establish a high standard of student behavior at Mines. The Code may only be amended through a student referendum supported by a majority vote of the Mines student body. Violations of the Student Honor Code should be reported to the Vice President for Student Life and Dean of Students Office for referral to the Student Judicial Panel for a hearing.

#### **Code:**

Mines students believe it is our responsibility to promote and maintain high ethical standards in order to ensure our safety, welfare, and enjoyment of a successful learning environment. Each of us, under this Code, shall assume responsibility for our behavior in the area of academic integrity.

As a Mines student, I am expected to adhere to the highest standards of academic excellence and personal integrity regarding my schoolwork, exams, academic projects, and research endeavors. I will act honestly, responsibly, and above all, with honor and integrity in all aspects of my academic endeavors at Mines. I will not misrepresent the work of others as my own, nor will I give or receive unauthorized assistance in the performance of academic coursework. I will conduct myself in an ethical manner in my use of the library, computing center, and all other school facilities and resources. By practicing these principles, I will strive to uphold the principles of integrity and academic excellence at Mines. I will not participate in or tolerate any form of discrimination or mistreatment of another individual.

A copy of the Department's Honor Code can be found in Appendix A.

## VI. NEW STUDENTS

### A. Potential applicants

All students applying to the PE graduate program must fill out and submit an application through the Graduate School Admissions program. These forms can be found online at <http://www.mines.edu/gradschoolapp/onlineapp.html>. All students, including current CSM students and alumni, must submit GRE scores, even those current students applying for the Combined BS/Master's program. Current students need only submit one (1) letter of reference. Work experience, authorship of research papers, etc., are NOT substitutes for GRE scores. Again, ALL applicants are required to submit GRE scores with their applications.

Before an applicant can apply to the PE program, they must have an appropriate background of certain core engineering, math, and science courses. For the PE program, these requirements correspond to: three (3) units of Calculus; two (2) units of Chemistry including quantitative lab; two (2) units of Physics; Differential Equations; Statics; Fluid Mechanics; Thermodynamics; and Mechanics of Materials.

### B. New Graduate Student Orientation

At the beginning of each semester, both CSM and the Department hold new graduate student orientation meetings. New students are required to attend both of these meetings. The CSM Graduate Office holds their orientation the day before the semester starts. The PE Department holds its orientation on the first day of the semester. For specific information about time and location, check with Denise Winn-Bower ([dwinnbow@mines.edu](mailto:dwinnbow@mines.edu) or 303-273-3945).

### C. Temporary Advisor vs. Permanent Advisor

In your acceptance letter from the Graduate School, you were assigned a faculty member as a temporary Advisor. Your temporary Advisor is here to help you set up your first semester's course schedule, become oriented to the program for which you are enrolled, and aid in your transition to graduate school. As the name implies, this person is a temporary, not a permanent Advisor. It is up to each individual graduate student to find a permanent Advisor. **This step must be completed by the end of your first semester of enrollment.** The process of finding a permanent Advisor is addressed in this Handbook in the "Selection of an Advisor" section for each degree program.

An example of the form for changing advisors is shown in Appendix B. The form can be found on the Graduate School webpage under "Online Forms". **Please note that this form must be completed and submitted even if your permanent Advisor was your temporary Advisor.**

Finally, your permanent Advisor can be changed if your interests change during your course of study or other circumstances prevail that warrant a change of advisors.

#### **D. Graduate Offices and Keys**

Graduate student office space is limited and is administered on a priority basis. Priority is given to students that have Research Assistantships (RA's), as well as, seniority and other factors. If you are interested in having office space in the department, please sign up with Denise Winn-Bower (dwinnbow@mines.edu or 303-273-3945) at the beginning of the semester.

If you qualify for office space, you will be notified when those assignments are made. If you are assigned an office or will need access to one of the research labs, you will need to complete the necessary paperwork provided by Denise Winn-Bower to obtain a key.

#### **E. Mailboxes**

There will be times when you need the use of a mailbox, and these are provided to all graduate students in the alcove across from MZ 114. Some mailboxes will be shared by two graduate students. Please DO NOT have personal mail sent to campus.

#### **F. Email**

Most on-campus and departmental communication is done by email and by default your mines.edu email is used. It is important to keep your email, phone number and address updated with Denise Winn-Bower and on the campus system.

### **VII. SAFETY TRAINING**

Safety of our students, faculty, and staff is the highest priority for the department! Please keep this in mind at all times during your graduate student career, and report any unsafe activity immediately to the PE Department office or the nearest faculty or staff member.

If you will be working in a laboratory, either for a class, for your research work, or as a teaching assistant, you will need to attend the annual safety training offered by the school. **All students that are working in laboratories must attend this training each year!**

Please check with the Laboratory Coordinator, Al Sami (asami@mines.edu or 303-273-3966) for a schedule of training dates.

## VIII. DEPARTMENTAL FACILITIES

### A. Computer Labs

The Department maintains two computer laboratories in MZ302 and MZ212. These computer labs are available for use for anyone taking a class in the PE Department, although the lab in MZ212 contains more of the software used in graduate classes. To obtain a password and access to the computer labs and systems, please email

No food or drinks are allowed in the labs. Additionally, do not prop the lab doors open as this interferes with the building's HVAC system. Printing paper is provided, but printing is expensive – please only print what you need and print on both sides if at all possible. If the printer is out of paper, please contact the personnel in the PE Department office for additional reams. **Finally, keep the labs clean – if they are abused in any way, access will be shut-off.**

### B. Research Labs

The Department maintains several research laboratories. Access to these labs is restricted to students working on associated research projects. If your research requires access to a given laboratory, please obtain written permission from your Advisor to acquire a key to that room/lab. This permission should be in the form on an email addressed to Denise Winn-Bower (dwinnbow@mines.edu).

## IX. STUDENT STATUS

### A. Provisional Acceptance

Provisional Acceptance is given to a student upon admission when that student needs to fulfill certain undergraduate course deficiencies (generally a function of having a previous degree in a discipline other than Petroleum Engineering). These deficiencies can include all or some of the following undergraduate PE or GE courses: PEGN 308, PEGN 310, PEGN 311, GEOL 308 or 315, PEGN 411, PEGN 413, PEGN 419, and/or PEGN 423. Students that fall into the Provisional Acceptance category are notified that they are required to take deficiency courses in their acceptance letter. The applicant can request to have a copy of their deficiency courses from the PE Department. The student will discuss their deficiency courses with their temporary or permanent Advisor within the first few days of the semester to arrange to take any deficiency courses to which they have been assigned. This is also the time to discuss prior coursework or transfer credits that could be substituted for deficiency courses. Once a student satisfactorily completes all of the assigned deficiency courses, they are considered to have full acceptance to the program for which they applied.

**Please note that these deficiency courses must be taken for a grade (no auditing or “no-credit” options).** As such, these course grades will be calculated in the student’s overall GPA. They DO NOT count toward the course credits for your respective degree program.

### **B. Switching Between MS and ME Options**

If a student was accepted for either the MS or ME program, they can apply to switch between the two. The first step to switch is to find a faculty member that will act as the student’s permanent Advisor for the new program. The next step is to then write a letter to the Department’s Graduate Admissions Committee (GAC) explaining why the student wants to switch between programs and who the Advisor will be. This letter should be submitted to Denise Winn-Bower (dwinnbow@mines.edu) who will then forward it to the GAC. The student will then be notified of the GAC’s decision to approve or decline the transfer.

### **C. Transfer of Credit**

As per the Graduate Bulletin, a student is allowed to transfer up to twelve (12) credit hours for the ME program, up to nine (9) credit hours for the MS program, and up to 45 course and research hours (dependent on previous degrees completed – see Graduate Bulletin for more information) from another institution. If a student wants to apply for transfer credits, they should supply all appropriate documentation for the subject courses (including syllabi, course notes, homework assignments, exams, etc.) along with a letter requesting the transfer to their advisor if a ME or their thesis committee if MS. Once approved by advisor or thesis committee information is provided Denise to inform the Graduate School of the accepted transfer classes. Only courses from an accredited university in which a grade of “B” or better was received will be considered for transfer.

### **D. Reduced Tuition**

Once a student completes the required number of total credit hours for their MS (36 total – 24 course and 12 research) or for their PhD (90 total – 60 course and 30 research), they are eligible for reduced tuition rates. If you fall into this category, please check on the Graduate School website to determine how to apply for this reduced tuition rate. An approved Admission to Candidacy form must be submitted to the Graduate School prior to being eligible for reduced tuition.

### **E. Combined Undergraduate/Graduate Program**

The Combined Undergraduate/Graduate Program offers CSM undergraduate students the opportunity to begin work on their ME or MS degree while completing their BS degree. Students interested in this combined program should apply to the program during the first semester of their Junior year and **must apply before the first semester of their Senior year**. A full application must be submitted via the Graduate School system and must

include a statement of goals, GRE scores no less than 138 Verbal, 155 Quantitative, and 3.0 Analytical, transcripts, and one (1) letter of reference from someone outside the PE Department.

Admission into the Combined Program allows students to enroll in 500-level courses and apply these directly to their graduate degree. It also allows for six (6) undergraduate class credit hours to be counted for both the undergraduate (BS) and graduate (ME or MS) program. Combined Program students are considered undergraduate students until such time as they complete their undergraduate program degree requirements. While taking graduate-level courses with an undergraduate degree status, the student must notify the Registrar's office that these graduate-level credits are to be counted for the appropriate graduate program (ME or MS). A Combined Program student must hold full graduate student status for at least one semester before they can graduate.

## **X. FINANCIAL ASSISTANCE**

The Department and CSM have designated funds for the support of Teaching Assistantships (TA's), Research Assistantships (RA's), scholarships, and fellowships for graduate funding. If you did not receive a financial aid offer at admission, there are numerous sources of funding from various professional groups and other entities off-campus that students are strongly encouraged to seek out. If a student is interested in applying for a TA position, they should provide their name to Patti Hassen (phassen@mines.edu) or Terri Snyder (tsnyder@mines.edu) in the PE Department office. If interested in an RA position, they should initiate discussions with faculty members working in areas of interest to the student.

## **XI. MASTER OF ENGINEERING (ME) REQUIREMENTS**

### **A. Coursework**

The Master of Engineering program is a coursework-only degree. It requires 36 hours of course work which must be approved by your Advisor and the Department Head.

### **B. Selection of an Advisor**

Students must select a permanent Advisor for their ME program by the end of their first semester. This process should begin by contacting a faculty member that they would like to see serve in this capacity and asking them if they would be interested in being your advisor. Once a student obtains permission from the faculty member they should submit a Change of Advisor form to the Graduate School (shown in Appendix B and available on the Graduate School's website). You should meet with your Advisor at least once a semester for approval on all coursework.

### **C. Finalization of Degree**

The semester that the student intends on graduating, they need to fill out, obtain the appropriate signatures, and submit to the Graduate School two forms – the Admission to Candidacy and the Graduation Application. Both of these forms can be found on the Graduate School website. Please note that the due dates for these forms are very early in any given semester. ***If the forms are not submitted by these dates, the Graduate School will deny the application for graduation and you will be required to register for the following semester.*** The due dates for any given semester are published on the Graduate School website and in the Colorado School of Mines Graduate Student Handbook for that year.

## **XII. MASTER OF SCIENCE (MS) REQUIREMENTS**

### **A. Coursework**

The Master of Science program is a research-based degree. It requires 24 hours of course work which must be approved by your **Advisor and thesis committee** and 12 hours of research credits. Additional information on minor areas, etc., can be found in the Graduate Bulletin.

### **B. Selection of an Advisor**

Students must select a permanent Advisor for their MS program by the end of their first semester. This process should begin by contacting a faculty member that they would like to see serve in this capacity, asking them if they would be interested in being your advisor, and discussions about your potential research project. Once a student obtains permission from the faculty member they should submit a Change of Advisor form (shown in Appendix B and available on the Graduate School's website) to the Graduate School.

### **C. Selection of a Research Project**

The selection of a research project is an extremely important step in a student's degree program. The student will work on this project for a significant amount of time and will be associated with it for the rest of their career; therefore, the decision will take time and should not be taken lightly. Selection of a research project will result from discussions with your Advisor and the student's personal areas of interest. The selection of a research project should take place during the second semester of enrollment.

### **D. Selection of a Committee**

Students must select their thesis committee before their thesis proposal defense. Generally, committee selection will occur during the second or third semester of

enrollment. This process should begin by discussing committee options with your Advisor, and then contacting the faculty members and asking them if they would be willing to serve on the committee. Once a student obtains permission from the faculty members they should obtain the faculty members' signatures on the Change of Thesis Committee form (same form as the Change of Advisor shown in Appendix B) and submit this form to the Graduate School.

A MS committee must consist of a minimum of three members, the Advisor and two other members, however more committee members can be included if helpful to the research work. If Co-Advisors are used, the committee must have two other members (total of four). The majority of committee membership must be full-time PE faculty. Off campus committee members can be included, but they must submit a Curriculum Vita to the Graduate Office and be approved by the Graduate School. **A student should seek committee members with interest and expertise in the various technical content of their thesis so they can help the students at any stage in their research.** Non-voting members can be added above and beyond the three base members. Additional information regarding thesis committees can be found in the Graduate Bulletin.

### **E. Thesis Proposal Preparation and Defense**

Students must prepare a written thesis proposal and defend it orally to their committee. The thesis proposal has many purposes for both the student and the thesis committee. From the student's point of view it helps to provide focus for the project, allows the student to gain input early in the project from all committee members, and provides a "road map" for them to follow to graduation. From the committee members' viewpoint, it allows them to provide input early in the thesis work, become more involved in the project if they choose, and prevent the thesis from taking invalid directions.

The written thesis proposal should be prepared by the student, approved by the Advisor, and then distributed to the committee members at least one week before the proposal defense. Thesis proposals might slightly differ based on the type of research, i.e. experimental, modeling, a combination of both, etc., as shown by the examples listed in Appendix C (and provided on the Department's website). It is highly recommended to write a thesis proposal using the same format requirements presented in the Thesis Writer's Guide published by the Colorado School of Mines Office of Graduate Studies. This document is available online or at the Office of Graduate Studies in Guggenheim Hall. The student should then set up a meeting with their committee to provide an oral defense of their proposal. This meeting is also an ideal time to get the committee's signatures on the Admission to Candidacy form (see below) for approval of coursework. At the latest, the thesis proposal and oral defense of the proposal should take place the semester before the semester of graduation (i.e. generally the third semester of enrollment).

MS candidates are also encouraged to conduct at least one committee meeting in order to provide updates of the progress in their thesis to the committee after a successful thesis proposal defense, especially if significant changes in the scope of work or objectives will be considered and feedback from the thesis committee members is necessary. All committee meetings should be documented using the **Thesis Committee Report** form (available online at <http://inside.mines.edu/Thesis-Committee-Report-Form>) in which a summary of the topics discussed during the meeting along with an assessment of student progress toward his/her degree by the Advisor and Committee are included.

## F. Thesis and Thesis Defense

The thesis defense will take place once the Advisor determines the student is ready to defend and the written thesis is in a condition that is defensible. **In this case, “defensible” means that the thesis is completely written and all chapters, front material, and references can be provided to the committee for review.** The student should then provide a hard copy of the thesis to each committee member and set up a defense date and time. The hard copy of the thesis must be submitted to the committee at least TEN DAYS prior to the defense date (this is a Departmental requirement). Once the defense day and time are set with the approval of all committee members, meet with Denise Winn-Bower to arrange for a room and submit all the necessary paperwork at least ONE WEEK before defense.

Prior to the day of the defense, the student should contact the Chair of the committee (not the Advisor) to discuss the format of the thesis defense. Generally, expect to provide a 20-25 minute presentation followed by a question and answer period. Thesis defenses are public, and all students should make an effort to attend all defenses conducted in the department.

The defense can result in three possible outcomes: 1) pass; 2) fail; or a 3) continuation of the defense. If the student fails, they will be allowed to make appropriate corrections to their research work and thesis as dictated by their committee. Upon approval of the changes by the committee, the student will be allowed to schedule and re-defend their thesis a second time. If failure occurs a second time, a third defense will not be allowed.

If a continuation of the defense is recommended by the committee, the specifics of the continuation will be determined at that point in time and a time/date for the continuation will be established.

Once the thesis is successfully defended, two forms will be completed or partially completed by the committee members at that time. First, the Oral Defense form is a PE Department form that states the student has completed an oral defense of their thesis. All committee members will sign this form at this time signifying a successful oral defense, and the student will be provided a copy with the original placed in the student's PE Department file. The second form, the Statement of Work Completion, is a Graduate

School form which must eventually be signed by all committee members. Upon completion of the oral defense, the form will be signed by all committee members who do not want to see the thesis again before the final thesis is published (i.e. they are giving their approval at this time). The Statement of Work Completion will not be signed by the Advisor at this time.

Once all corrections recommended by the committee have been made and approved by the Advisor and any committee members that have not signed the form, the student should obtain the Advisor's and these remaining committee members' signatures on the Statement of Work Completion. The student must then provide a clean, signed copy of the thesis and the Statement of Work Completion to the Department Head who will then review the thesis, make final recommended corrections, and sign the form thus providing the PE Department's approval of the thesis.

Please note that the student should allow a MINIMUM of two weeks between the defense and the final date for graduation checkout to allow for enough time to make corrections, allow proofreading by the committee (if necessary), the Advisor, and the Department Head, and complete the checkout process.

### **G. Typical Time Table**

A typical time table for the MS degree is as follows:

First Semester	<ul style="list-style-type: none"> <li>• Coursework (12 hrs)</li> <li>• Select Advisor</li> </ul>
Second Semester	<ul style="list-style-type: none"> <li>• Coursework (12 hrs)</li> <li>• Determine Thesis Committee</li> </ul>
Third Semester	<ul style="list-style-type: none"> <li>• Prepare and Defend Thesis Proposal</li> <li>• Submission of Admission to Candidacy Form</li> </ul>
Fourth Semester	<ul style="list-style-type: none"> <li>• Submission of Graduation Application</li> <li>• Defend Thesis</li> </ul>

Every student's program is individual, and therefore, the timetable shown above can be modified as needed for that person. If a student has deficiencies, the "First Semester" shown above is intended to be the first semester after completion of those deficiencies.

### **H. Finalization of Degree**

The semester that the student intends on graduating, they need to fill out, obtain the appropriate signatures, and submit to the Graduate School two forms – the Admission to Candidacy and the Graduation Application. Both of these forms can be found on the

Graduate School website. Please note that the due dates for these forms are very early in any given semester. ***If the forms are not submitted by these dates, the Graduate School will deny the application for graduation and you will be required to register for the following semester.*** The due dates for any given semester are published on the Graduate School website and in the Colorado School of Mines Graduate Student Handbook for that year. (If the Admission to Candidacy form has already been approved and submitted to the Graduate School during a previous semester, only the Graduation Application needs to be filed during the student's final semester.)

Once a successful defense of the thesis is completed, and the student has the Statement of Work Completion signed, they will need to complete the Checkout Form provided by the Graduate School. Specific questions regarding this form and completion of it should be directed to the student's Advisor or Denise Winn-Bower.

### **XIII. DOCTOR OF PHILOSOPHY (PHD) REQUIREMENTS**

#### **A. Coursework**

The Doctor of Philosophy program is a research-based degree. It requires a minimum of 90 hours past the bachelor's degree, 30 hours of which must be research credits. If the student has a Master of Science degree, it requires a minimum of 54 hours past the MS degree, 30 hours of which must be research credits. All coursework must be approved by your Advisor and dissertation committee.

#### **B. Selection of an Advisor**

Students must select a permanent Advisor for their PhD program by the end of their first semester. This process should begin by contacting a faculty member that they would like to see serve in this capacity, asking them if they would be interested in being your advisor, and discussions about your potential research project. Once a student obtains permission from the faculty member they should submit a Change of Advisor form (shown in Appendix B and available on the Graduate School's website) to the Graduate School.

#### **C. Selection of a Research Project**

The selection of a research project is a critical step in a student's PhD degree program. The student will work on this project for a significant amount of time and will be associated with it for the rest of their career; therefore, the decision will take time and should not be taken lightly. Selection of a research project will result from discussions with your Advisor and the student's personal areas of interest. The selection of a research project should take place during the second semester of enrollment.

## **D. Selection of a Committee**

Students must select their PhD dissertation committee no later than the end of their second semester. This process should begin by discussing committee options with your Advisor, and then contacting the faculty members and asking them if they would be willing to serve on the committee. Once a student obtains permission from the faculty members they should obtain the faculty members' signatures on the Change of Thesis Committee form (same form as the Change of Advisor shown in Appendix B) and submit this form to the Graduate School. The Committee Chair should also be designated at this point in time (the Committee Chair cannot be your major Advisor, Co-Advisor (if used), or minor Advisor). Generally the Chair is your at-large committee member.

A PhD committee must consist of a minimum of five members, the PE Advisor, the minor Advisor, an at-large member, and two other members. More than five committee members can be included if helpful to the research work, however, the majority of the committee must consist of full-time PE department faculty. If Co-Advisors are used, the committee must still have the minor Advisor, at-large member, and two other members, therefore, making a total of six committee members. Off campus committee members can be included, but they must submit a Curriculum Vita to the Graduate Office and be approved by the Graduate School. **A student should seek committee members with interest and expertise in the various technical content of their thesis so they can help the students at any stage in their research work.** Non-voting members can be added above and beyond the five base members. Additional information regarding thesis committees can be found in the Graduate Bulletin.

## **E. Minor Program**

PhD students are required to take 12 of their course credit hours in a minor field of study. This minor area should complement the major area of research study. Courses for the minor must be approved by the major Advisor, the minor Advisor, and the PhD committee.

## **F. Comprehensive Exams**

Comprehensive exams consist of two components – the Departmental Qualifying Exam and the Committee Comprehensive Exam.

The Qualifying Exam is given once a year generally during the spring semester and consists of a series of written tests on various PE topics. PhD students must take this exam within four semesters of starting the PhD graduate program. The Qualifying Exam is administered by the Graduate Admissions Committee and questions are supplied by all faculty members. The Qualifying Exam is taken over a two-week period as follows:

- Week One – each topic grouping will be administered on one day:
  - Monday: Drilling/Completions/Production
  - Wednesday: Rock and fluid properties/Reservoir Engineering/Economics
  - Friday: Math/Basic engineering
- Week Two – a written scientific analysis

The Committee Comprehensive Exam will be administered by the student's dissertation committee. At a minimum, it will consist of an oral exam conducted by and in front of all committee members. Admission of additional written exams by the committee members is up to that individual committee member. The Committee Comprehensive Exams should be arranged by the student after all parts of the Department's Qualifying Exam are successfully passed.

### **G. PhD Candidacy**

A student is only considered a formal PhD Candidate when they have passed their comprehensive exams, submitted their Admission to Candidacy form, and completed their paperwork for selection of their committee.

### **H. Dissertation Proposal Preparation and Defense**

Students must prepare a written dissertation proposal and defend it orally to their committee. The dissertation proposal has many purposes for both the student and the dissertation committee. From the student's point of view it helps to provide focus for the project, allows the student to gain input early in the project from all committee members, and provides a "road map" for them to follow to graduation. From the committee members' viewpoint, it allows them to provide input early in the research work, become more involved in the project if they choose, and prevent the dissertation from taking invalid directions.

The written dissertation proposal should be prepared by the student, approved by the Advisor, and then distributed to the committee members at least one week before the proposal defense. Dissertation proposals might slightly differ based on the type of research, i.e. experimental, modeling, a combination of both, etc., as shown by the examples listed in Appendix C (and provided on the Department's website). It is highly recommended to write a dissertation proposal using the same format requirements presented in the Thesis Writer's Guide published by the Colorado School of Mines Office of Graduate Studies. This document is available online or at the Office of Graduate Studies in Guggenheim Hall. The student should then set up a meeting with their committee to provide an oral defense of their proposal. This meeting is also an ideal time to get the committee's signatures on the Admission to Candidacy form (see below) for approval of coursework. At the latest, the dissertation proposal and oral defense should

take place the semester after the successful completion of their qualifying exam (i.e. generally the fourth or fifth semester of enrollment).

PhD candidates are also encouraged to conduct at least one committee meeting in order to provide updates of the progress in their dissertation to the committee after the dissertation proposal defense, especially if significant changes in the scope of work or objectives will be performed, and feedback from the committee members is necessary. All committee meetings should be documented using the **Thesis Committee Report** form (available online at <http://inside.mines.edu/Thesis-Committee-Report-Form>) in which a summary of the topics discussed during the meeting along with an assessment of student progress toward his/her degree by the Advisor and Committee are included.

## **I. Dissertation and Dissertation Defense**

The dissertation defense will take place once the Advisor determines the student is ready to defend and the written dissertation is in a condition that is defensible. **In this case, “defensible” means that the thesis is completely written and all chapters, front material, and references can be provided to the committee for review.** The student should then provide a hard copy of the dissertation to each committee member and set up a defense date and time. The hard copy of the thesis must be submitted to the committee at least TEN DAYS prior to the defense date (this is a Departmental requirement). Once the defense day and time are set with the approval of all committee members, meet with Denise Winn-Bower to arrange for a room and submit all the necessary paperwork ONE WEEK before defense.

Prior to the day of the defense, the student should contact the Chair of the committee (not the Advisor) to discuss the format of the dissertation defense. Generally, expect to provide a 25-30 minute presentation followed by a question and answer period. Dissertation defenses are public, and all students should make an effort to attend all defenses conducted in the department.

The defense can result in three possible outcomes: 1) pass; 2) fail; or a 3) continuation of the defense. If the student fails, they will be allowed to make appropriate corrections to their research work and dissertation as dictated by their committee. Upon approval of the changes by the committee, the student will be allowed to schedule and re-defend their dissertation a second time. If failure occurs a second time, a third defense will not be allowed.

If a continuation of the defense is recommended by the committee, the specifics of the continuation will be determined at that point in time and a time/date for the continuation will be established.

Once the dissertation is successfully defended, two forms will be completed or partially completed by the committee members at that time. First, the Oral Defense form is a PE

Department form that states the student has completed an oral defense of their dissertation. All committee members will sign this form at this time signifying a successful oral defense, and the student will be provided a copy with the original placed in the student's PE Department file. The second form, the Statement of Work Completion, is a Graduate School form which must eventually be signed by all committee members. Upon completion of the oral defense, the form will be signed by all committee members who do not want to see the dissertation again before the final version is published (i.e. they are giving their approval at this time). The Statement of Work Completion will not be signed by the Advisor at this time.

Once all corrections recommended by the committee have been made and approved by the Advisor and any committee members that have not signed the form, the student should obtain the Advisor's and these remaining committee members' signatures on the Statement of Work Completion. The student must then provide a clean, signed copy of the dissertation and the Statement of Work Completion to the Department Head who will then review the dissertation, make final recommended corrections, and sign the form thus providing the PE Department's approval of the dissertation.

Please note that the student should allow a MINIMUM of two weeks between the defense and the final date for graduation checkout to allow for enough time to make corrections, allow proofreading by the committee (if necessary), the Advisor, and the Department Head, and complete the checkout process.

### **J. Time Table**

Full-time PhD students MUST satisfy the comprehensive exam and course requirements and submit the Admission to Candidacy form within the first two calendar years after enrolling in the program. Failure to fulfill these requirements within the time limits specified may result in immediate mandatory dismissal from the program. A typical time table for the PhD degree is as follows:

First Semester	<ul style="list-style-type: none"> <li>• Start</li> <li>• Coursework (12 hrs)</li> <li>• Select Advisor</li> </ul>
Second Semester	<ul style="list-style-type: none"> <li>• Coursework (12 hrs)</li> <li>• Determine Dissertation Committee</li> </ul>
Third Semester	<ul style="list-style-type: none"> <li>• Qualifying Exam</li> <li>• Committee Comprehensive Exam</li> </ul>
Fourth Semester	

Fifth Semester	<ul style="list-style-type: none"> <li>• Defend Dissertation Proposal</li> <li>• Submission of Admission to Candidacy Form</li> </ul>
Sixth Semester	
Seventh Semester	<ul style="list-style-type: none"> <li>• Submission of Graduation Application</li> <li>• Defend Dissertation (Earliest)</li> </ul>

Every student's program is individual, and therefore, the timetable shown above can be modified as needed for that person. If a student has deficiencies, the "First Semester" shown above is intended to be the first semester after completion of those deficiencies.

### **K. Finalization of Degree**

Two Graduate School forms are required for graduation – the Admission to Candidacy and the Graduation Application. Both of these forms can be found on the Graduate School website. Please note that the due dates for these forms are very early in any given semester. *If the forms are not submitted by these dates, the Graduate School will deny the application for graduation and you will be required to register for the following semester.* The due dates for any given semester are published on the Graduate School website and in the Colorado School of Mines Graduate Student Handbook for that year. (If the Admission to Candidacy form has already been approved and submitted to the Graduate School during a previous semester, only the Graduation Application needs to be filed during the student's final semester.)

Once a successful defense of the dissertation is completed, and the student has the Statement of Work Completion signed, they will need to complete the Checkout Form provided by the Graduate School. Specific questions regarding this form and completion of it should be directed to the student's Advisor or Denise Winn-Bower.

## **XIV. MISCELLANEOUS**

### **A. Student Organizations**

The Society of Petroleum Engineers (SPE), Pi Epsilon Tau (PET), American Rock Mechanics Association (ASRM) and the Association of American Drilling Engineers (AADE) all have student chapters on campus. All students, both graduate and undergraduate, are encouraged to become involved in the activities of these groups.

### **B. Courses on Professionalism**

ALL graduate students, including ME, MS, and PhD programs, are required to complete three (3) credit hours of course work in writing, research, or presentation intensive

classes such as PEGN 681, LICM 501, LAIS 601, SYGN 501, and/or SYGN 600. The combination of these courses to satisfy the three-credit-requirement should be discussed with your Advisor. You are encouraged to take the courses which will help you most with your respective degree (i.e. an MS or PhD student should consider writing intensive classes to help prepare for writing their thesis or dissertation).

### **C. Attendance at Thesis/Dissertation Defenses and Other Department Seminars**

A key component to being a successful graduate student is intellectual curiosity. As such, the department **STRONGLY** encourages the attendance of all graduate students at all Department MS and PhD defenses. Additionally, several Department seminars are held throughout the year by visiting scholars and other professionals. All graduate students are **STRONGLY ENCOURAGED** to attend. Attendance at these functions is **MANDATORY** for new graduate students, in their first year.

### **D. Writing References**

In graduate school it is expected that the student become proficient in technical writing including but not limited to class reports and summaries, term projects, technical papers, thesis or dissertation proposals and thesis or dissertations. A useful resource to improve writing is the CSM Liberal Arts & International Studies (LAIS) Writing Center, which offers services to students to help them learn how to write effectively. In addition, the following list includes suggested references on technical and general writing.

Haile, J. M. 2001. *Technical Style: Technical Writing in a Digital Age*. Central, South Carolina: Macatea Productions.

Thyer, B. A. 1994. *Successful Publishing in Scholarly Journals*. SAGE Publications.

Beer, D. and Mc. Murrey, D. 2005. *A Guide to Writing as an Engineer*, second edition: Wiley.

Lusford, A. and Connors, R. 1997. *The Everyday Writer*. St. Martin's Press, Inc.

### **E. Department Personnel**

#### **STAFF**

*Denise Winn-Bower* – Supports the FAST and MCERS research groups; supports the Graduate Admissions Committee; handles all items relating to graduate students (i.e. maintains student files, monitors advisor/committee change forms, schedules defenses; etc.)

*Patti Hassen* – Maintains the Department’s accounts; handles Department Head’s correspondence; purchasing and contracts; student employment contracts (except for the MCERS and FAST research groups).

*Terri Snyder* – Provides information about the department; assists students, public, faculty; handles all items relating to undergraduate students (i.e. drop/add forms, assignment of advisors, etc.); processes travel authorizes; works with student groups.

*Al Sami* – Supports all laboratories, both teaching and research; responsible for safety of laboratories.

*Joe Chen* – Supports all laboratories, both teaching and research; responsible for safety of laboratories.

## **FACULTY**

See the PE Departmental website for a listing of the current faculty and their areas of expertise. <http://petroleum.mines.edu/>

## XV. APPENDICES

### A. Appendix A – PE Department Honor Code

August 22, 2011

#### ACADEMIC HONOR

After examination and review of our Resolution on Academic Honor dated March 19, 1985, the Faculty of the Petroleum Engineering Department of the Colorado School of Mines once again unanimously reaffirms the following Resolution:

It Shall be Resolved that:

I. The Faculty of Petroleum Engineering, Colorado School of Mines, expects intellectual honesty and integrity in the performance of academic assignments, both in the classroom and outside. When he or she enrolls as a student of Petroleum Engineering, each student accepts this responsibility with the understanding that a person who submits work which is not his or her own violates the purpose of the Colorado School of Mines and may forfeit his or her right to continue in Petroleum Engineering.

II. The Faculty recognizes its obligation: (a) to provide continuing guidance as to what constitutes academic honesty; (b) to promote procedures and circumstances which will reinforce the principle of academic honor; (c) to review constantly the effective operation of this principle.

III. The PE Faculty shall undertake: (a) to publish and interpret the Resolution on Academic Honor to the student body each year; (b) to adjudicate reported violations according to established procedures; (c) to review constantly the effective operation of this principle and, if necessary, make recommendations to the Administration of the Colorado School of Mines for maintaining the spirit of this Resolution.

The following statement implements the preceding Resolution.

The Honor Principle: Fundamental to the principle of independent learning is the requirement of honesty and integrity in the performance of academic assignments, both in the classroom and outside. A student who submits work which is not his or her own, may forfeit the opportunity to continue as a student of Petroleum Engineering at CSM.

The Honor Principle depends on the willingness of students, individually and collectively, to maintain and perpetuate standards of academic honesty. Each student

accepts the responsibility not only to be honorable in his or her own academic affairs, but also to support the principle as it applies to others. This Honor Principle is intended to complement the Colorado School of Mines Student Honor Code adopted by the Student Body in March 2003 (attached).

A student who becomes aware of a violation of the principle is bound by honor to take action. He or she may report the violation, speak personally to the student, exercise some form of social sanction, or do whatever is appropriate under the circumstances. If he or she stands by and does nothing, he or she threatens both the spirit and the operation of the principle of academic honor.

Examinations: No student shall give or receive assistance in an examination or written quiz.

Papers, Term Projects, and Research: Any form of plagiarism is dishonest.

Library Use: No student may infringe upon the right of others to have fair and equal access to library sources. Failure to sign for material taken from the library and similar abuse of library privileges is considered academic dishonesty.

Computer Use: Every user of CSM's computer facilities has two fundamental rights: privacy and a fair share of resources. Violation of this code that affects academic performance is considered academic dishonesty.

Faculty members of the Petroleum Engineering Department of CSM unanimously endorse this Resolution.

_____ Ramona M. Graves, Department Head	_____ Erdal Ozkan
_____ Linda A. Battalora	_____ Manika Prasad
_____ Alfred W. Eustes III	_____ Azra N. Tutuncu
_____ Todd Hoffman	_____ Craig W. Van Kirk
_____ Hossein Kazemi	_____ Yu-Shu Wu
_____ Mark G. Miller	_____ Xiaolong Yin
_____ Jennifer L. Miskimins	

A thank you is extended to Dartmouth College for providing some of the ideas for this Resolution.

**B. Appendix B – Advisor/Thesis Committee Change Form**

**Colorado School of Mines  
Office of Graduate Studies  
Advisor / Thesis Committee**

Use this form to establish a *Full Thesis Committee*, or to designate an *Advisor* or *Co-Advisor*. Please TYPE all names and print this form. Faculty must indicate approval by initialing after their name.

Student Name:	<input type="text"/>	CWID:	<input type="text"/>
Degree Title:	<input type="text"/>	Date:	<input type="text"/>
Program Title:	<input type="text"/>		
Minor Program:	<input type="text"/>		

Check one of the following that apply to this request:

Initial Advisor or Committee Request

Change to an existing and approved Advisor or Committee

*Voting Members:*

Advisor:	<input type="text"/>	Depart.	<input type="text"/>
Co-Advisor (Optional):	<input type="text"/>	Depart.	<input type="text"/>
Committee Members*:	<input type="text"/>	Depart.	<input type="text"/>
	<input type="text"/>	Depart.	<input type="text"/>
	<input type="text"/>	Depart.	<input type="text"/>
Minor Representative:	<input type="text"/>	Depart.	<input type="text"/>
Member at Large (PhD)**:	<input type="text"/>	Depart.	<input type="text"/>

\*You must attach a brief resume for any off-campus Committee members holding voting status.  
\*\*Member at Large must be a Mines faculty member from outside home or allied departments.

*Additional Non-voting Members:*


*Approvals:*

Department Head/Division Director:	<input type="text"/>
Program Chair (if appropriate):	<input type="text"/>

Form Last Modified: 08/17/11

**C. Appendix C – Examples of Thesis/Dissertation Proposals**

Example #1 – Experiment-based Thesis Proposal

Example #2 – Statistics-based Thesis Proposal

Example #3 – Modeling-based Dissertation Proposal

Example #4 – Experiment and Modeling-based Dissertation Proposal

Available on the PE Department Webpage under “About Us”

[http://petroleum.mines.edu/about\\_us.html](http://petroleum.mines.edu/about_us.html)