GRADUATE STUDENT HANDBOOK

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Section 1. Graduate Degrees and Advising of Students

The Graduate Program in Energy and Mineral Engineering grants the following degrees:

- Ph.D.
- M.S. (Thesis-based)
- M.S. (Non-Thesis, Course-Based)
- Integrated B.S./M.S. Program in Energy and Mineral Sciences

The graduate program embraces topics that span research and graduate education in EME spans petroleum engineering and reservoir characterization, electricity market design, grid integration of diverse fuels and technology, mining engineering and mineral processing, fuel chemistry and processing, energy conversion engineering, environmental safety and health related issues associated with the energy and mineral resource sector, among many others. Methodologies include experimental laboratory science, computational modeling and simulation, and advanced data analytics. The program develops and integrates approaches based on observational, computational, and analytical techniques, and seeks to advance both fundamental understanding and predictive skill.

The requirements for the M.S. and Ph.D. degrees are different. A person granted an M.S. degree will have demonstrated a broad, thorough knowledge of the major areas within the energy and mineral sciences as well as an ability to complete and summarize a research study. Accordingly, a successful M.S. candidate must write and defend a thesis or paper approved by three committee members and the Department Associate Head of the Graduate Program. The Master's program normally requires two years to complete.

A person granted a Ph.D. degree will have demonstrated, in addition to the broad level of knowledge required of an M.S. candidate, both an expertise in an area of the discipline and an ability to perform independent, creative research within that area. Accordingly, the successful Ph.D. candidate must pass four exams, the Qualifying, Technical English Competency, Comprehensive, and Final Oral Exams, and must write a dissertation summarizing the performed research. The Ph.D. committee for each candidate consists of a minimum of four members of the Graduate Faculty and is normally chaired by the candidate's adviser. The Ph.D. program may require up to five years to complete, or an additional four years after an M.S. is earned.

Most students are classified as degree students in either the M.S. or the Ph.D. program. A student may be classified as provisional, but this classification is only a temporary one.

1.1 Academic Status

A graduate student is expected to maintain at least a 3.00 cumulative grade point average and to have obtained a research supervisor by the end of his or her second semester in residence. If a student maintains this average and has obtained a research supervisor, then this student will retain regular academic status.

The progress of a student in the graduate program will be monitored closely by the student’s thesis committee and the Associate Head of the Graduate Program. A formal review of all students will be performed by the Associate Head after each spring semester. A student’s transcript through the recently
completed spring semester, and an updated student and adviser's report on research progress (same as the annual progress report) will be considered in the review.

The program of a graduate student will be terminated for unsatisfactory scholarship if any of the following conditions are met:

1. Failure to exhibit and promote the highest ethical, moral, and professional standards

   This includes but is not limited to academic integrity violations, instances of plagiarism or submitting fraudulent research results, or cheating on milestone exams or in graduate courses. All suspected cases will undergo the processes specified by the graduate school (GCAC-801) and the academic integrity procedures for the College of Earth and Mineral Sciences.

2. Inadequate grade-point average

   Consistent with Graduate School Policy (GCAC-404) and all graduate programs at Penn State, the Graduate Program in Energy and Mineral Engineering requires that graduate students maintain a Grade Point Average (GPA) of 3.00 or higher. If a student's overall GPA (not including EME 600 credits), falls below 3.00 for one semester, the student will be provided a warning from the Associate Head. If the student’s GPA remains below 3.00 for two consecutive semesters or if the student receives a D or F in any semester, this will constitute grounds for termination.

3. Failure to make satisfactory progress in research

   If a graduate student, as evaluated by his/her research advisor or dissertation committee, fails to make sufficient progress in research or if the research is of unacceptably low quality, they will receive a warning from the Associate Head. If after a warning required minimum progress is not demonstrated, this may constitute grounds for termination from the graduate program.

   For Ph.D. degree students, a faculty member must agree to be the dissertation research advisor no later than the second semester (by the end of the first year in the program). Because a Ph.D. is, by design, a mentored research experience, doctoral students cannot remain in the program more than one semester without a committed advisor.

4. Failing the qualifying, comprehensive, or final oral examination for doctoral students

   For all formal milestone exams – qualifying examination, comprehensive examination, and final dissertation defenses – students will be allowed two attempts to pass before termination.

The student will be notified of this decision according to Graduate School policy (GCAC-803).
If any of the above conditions are met, then the Associate Head, after consultation with the appropriate faculty, will summarize the actions that must be taken by the student during the following semesters for adequate progress on eliminating the above deficiencies. Each subsequent semester, the Associate Head and appropriate faculty will ascertain whether this student has demonstrated sufficient progress to be allowed to remain in the graduate program.

1.2 Student Committees and Advisers

Incoming graduate students may consult with the Associate Head for the Graduate Program about their course selections for the first academic year. Each student is expected to identify a faculty research advisor and to select a research topic or have received a research assistantship within the first academic year.

Once a research topic has been identified, each student must form a committee composed of the student’s adviser and two other faculty members familiar with the research area. One of these two members may be from another institution if appropriate. Each semester, the committee should meet informally with the student to review the student’s progress toward the degree and to offer advice as needed. The Graduate Staff Assistant in 103 Hosler has a form on which is listed the members of this committee.

Soon after passing the Ph.D. Qualifying Exam, each Ph.D. student must form a regular Ph.D. committee having at least four Graduate Faculty members, at least one of whom is from outside the Department of Energy and Mineral Engineering. Committee members from other institutions can be added as special members, beyond the minimum of the four Penn State members. A committee signatory page must be obtained from the Graduate Staff Assistant in the department. Note that the Graduate School must be notified of the membership of the regular Ph.D. committee at least three weeks before the student’s Comprehensive Exam is scheduled.

1.3 Academic Progress

The department requires each student to complete an annual progress report. The report is due to the Associate Head for the Graduate Program by June 1 every year and will be used in the annual review that summer of each student's progress through the spring semester. For this report, fill out appropriate form for a M.S. student or a Ph.D. student.

1.4 Course Registration

Students should register on the web via LionPATH well in advance of the first day of classes – by the end of October for the following spring semester, and by late March for the following summer session and the following fall semester. Students are strongly encouraged to register as soon as possible so that adjustments in course offerings can be made in a timely fashion. Students may register for or drop courses during the first week of classes at no charge, but after the first week there is a nominal charge for making changes. Course controls have been placed on EME 601. A student will need to have these courses added manually to his or her schedule by the Graduate Staff Assistant, in the Energy and Mineral Engineering, Main Office, 103 Hosler Building.
1.5 International (F-1 and J-1) Students

The Immigration and Naturalization Service (INS) has regulations that pertain to international students with F-1 and J-1 visas. Each student is responsible for learning about and abiding by these regulations. Students or faculty who have questions regarding these regulations should contact the Penn State University Office of Global Programs or may e-mail questions to dissa-adviser@psu.edu. International graduate students need to maintain full academic status at all times.

It is advisable to frequently check https://global.psu.edu/category/international-students for updates. This website contains detailed information about the SEVIS fee, rules and regulations governing international students, such as change of address, maintaining status, necessary immigration documents, authorization for off-campus employment, health insurance, taxes, dependent visas (if you want to move your spouse here, for example), obtaining a driver’s license, and Social Security.

Section 2. University Course Regulations

2.1 Maximum Credit Loads

The maximum number of credits for which students holding regular or supplemented assistantships (see Section 5) may register are restricted by the Graduate School. These limitations are summarized in Table 1 and apply to all 400-, 500- and 600-level courses except audits and EME 601. For most M.S. and pre-comprehensive Ph.D. students on assistantships, this number is 12 credits in both the fall and spring semesters. In a particular semester, more credits than those listed may be taken, provided that fewer are taken in subsequent semesters so that the annual total does not exceed that implied by the table. Note that a student holding an assistantship may take more than 12 credits in a fall or spring semester or more than 5 credits in the summer only with the written permission of the Department Head or Associate Head of the Graduate Program. Without such approval, the department may terminate the assistantship.

Although credit limits for the summer are listed, most graduate students holding research assistantships in the fall and spring semesters do not register in the summer but are paid on a summer assistantship.

<table>
<thead>
<tr>
<th>Table 1. Maximum Credit Loads for Graduate Students Supported by Assistantships or Fellowships</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall and Spring Semesters</strong></td>
</tr>
<tr>
<td>Status</td>
</tr>
<tr>
<td>No Assistantship</td>
</tr>
<tr>
<td>Regular Assistantship</td>
</tr>
</tbody>
</table>
2.2 Grades

The following +/- grading system is used for both undergraduate and graduate students: A, A-, B+, B, B-, C+, C, D, or F. Grade point averages are based on a four-point scale, with an A being 4.00, a B, 3.00, etc. All graduate students are required to maintain at least a B, or 3.00, average. The grade R, which denotes satisfactory progress, and which is not used in calculating a grade point average, may be used in the courses listed in Table 2 below.

<table>
<thead>
<tr>
<th>Number</th>
<th>Title</th>
</tr>
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<tbody>
<tr>
<td>EME 600*, 601*</td>
<td>Thesis Research</td>
</tr>
</tbody>
</table>

+ A grade of C is assigned by the student's adviser for unsatisfactory attendance.
* Quality grades (A–F) are given in these courses for 6 credits for thesis-option M.S. students and for up to 12 credits for Ph.D. students.

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Section 3. Degree Requirements - M.S.

3.1 Summary of Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the Graduate Bulletin.

Course requirements. The M.S. degree is offered with thesis or non-thesis options. M.S. Thesis based students are required to complete a minimum of 30 credits. M.S. Non-Thesis based students are required to complete a minimum of 36 credits.

THESIS-BASED M.S. in EME (30 credits total): Students are required to complete a minimum of 30 credits total (at least 18 at the 500 or 600 level) including: 24 credits in course work, 6 thesis credits (EME 600 Thesis Research), and a thesis accepted by the adviser(s) and committee members, the head of the graduate program, and the Graduate School. The student must pass a thesis defense.

NON-THESIS BASED M.S. in EME (36 credits total): Students are required to complete a minimum of 36 credits in total (at least 24 at the 500 level) including: 33 credits in course work and 3 credits for the completion of a culminating research experience. Within the 33 credits of coursework, M.S. students must take at least two extra courses (6 credits) from the EME core course list (beyond the six credit M.S. core requirement) or chosen graduate option (beyond the option’s 12-credit minimum option requirement). The non-thesis culminating research experiences are:

- Paper-based M.S.: Students take three (3) credits of non-thesis research (EME 596 Individual Studies) and complete a satisfactory scholarly paper evaluated by adviser(s) and a reader.
Table 3. Required Minimum Credit Distribution for M.S. Students in Energy and Mineral Engineering

*All M.S. students must take two (2) of the required EME core:*  
EME 501 Design Under Uncertainty in Energy and Mineral Systems  
EME 511 Interfacial Phenomena in Energy and Mineral Systems  
EME 521-Mathematical Modeling of Energy and Mineral Systems  
EME 531 Thermodynamics of Energy and Mineral Systems  
EME 551 Safety, Health and Environmental Risks in Energy and Mineral Production

All M.S. students who select an option must select 12 credits from their option:

<table>
<thead>
<tr>
<th>Energy Systems Engineering (ESysE)</th>
<th>Fuel Science (FSc)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EME 522 3 Computational Methods for Electric Power Systems Analysis</td>
<td>CHE 544 or CHE 546 3 General Transport Phenomena</td>
</tr>
<tr>
<td>EME 523 3 Stochastic Optimization Methods of Energy and Environmental System</td>
<td>EME 570 or CHE 536 3 Catalytic Materials</td>
</tr>
<tr>
<td>EME 524 3 Machine Learning for Energy and Mineral Engineering Problems</td>
<td>FSC503 or CHE 510 3 Analytical Methods in Fuel Science</td>
</tr>
<tr>
<td>EME 526 3 Solar Utility and Portfolio Management</td>
<td>Surface Characterization of Materials</td>
</tr>
<tr>
<td>EME 527 3 Stochastic Modeling of Spatial Variability in Energy and Environmental Systems</td>
<td>FSC 504 3 Problems in Fuels Engineering</td>
</tr>
<tr>
<td>ENNEC 540 3 Economic Analysis of Energy Markets</td>
<td>FSC 506 3 Carbon Reactions</td>
</tr>
<tr>
<td>IE 505 3 Linear Programming</td>
<td>ME 523 3 Numerical Solutions Applied to Heat Transfer</td>
</tr>
<tr>
<td>IE 516 3 Applied Stochastic Processes</td>
<td>Fluid Mechanics Problems</td>
</tr>
</tbody>
</table>

<table>
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<tr>
<th>Mining and Mineral Process Engineering (MMPE)</th>
<th>Petroleum and Natural Gas Engineering (PNGE)</th>
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</thead>
<tbody>
<tr>
<td>MNG 512 3 Valuation of Mineral Properties and Mining Projects</td>
<td>PNG 501 3 Flow in Porous Media</td>
</tr>
<tr>
<td>MNG 541 3 Surface Mine Equipment Selection Analysis</td>
<td>PNG 502 3 Coupled Flow and Deformation in Porous Media</td>
</tr>
<tr>
<td>MNG 554 3 Rock Mechanics Design</td>
<td>PNG 512 3 Numerical Reservoir Simulation</td>
</tr>
<tr>
<td>MNPR 404 3 Particle Separation</td>
<td>PNG 518 3 Design of Miscible Recovery Projects</td>
</tr>
<tr>
<td>MNPR 507 3 Hydrometallurgical Processing</td>
<td>PNG 520 3 Thermodynamics of Hydrocarbon Fluids</td>
</tr>
<tr>
<td></td>
<td>PNG 526 3 Well Stimulation</td>
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<tr>
<td></td>
<td>PNG 530 3 Natural Gas Engineering</td>
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<td></td>
<td>PNG 555 3 Unconventional Resources Analysis</td>
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<tr>
<td></td>
<td>PNG 566 3 Reservoir Characterization</td>
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<tr>
<td></td>
<td>PNG 577 3 Production and Completions Engineering</td>
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<tr>
<td></td>
<td>PNG 597 3 Special Topics (when taught, may be used to partially satisfy the PNGE option minimum credit requirement)</td>
</tr>
<tr>
<td></td>
<td>PNG 596 INDIVIDUAL STUDIES MAY NOT BE USED WITHIN THIS OPTION.</td>
</tr>
</tbody>
</table>

**Thesis option:**
- Thesis Base Option Students must complete at least (18) 500-level credits (6 courses) beyond the EME core course requirements.
- Thesis Students in other Options (ESysE, FSc, MMPE, PNGE) must complete an additional 12 credits (4 courses) of 500-level courses
- EME 600 – Minimum 6 credits
**Non-thesis option:**

- Non-Thesis Base Option Students must complete at least 27 additional credits of 500-level courses which must include 2 additional core EME courses.

- Non-Thesis Option students (ESysE, FSc, MMPE, PNGE) in addition to the 12 credits of option courses are required to complete an 15 additional credits (5 courses) of 500-level courses. Of these 5 courses, at least two of these course must be from the EME core and/or [EME M.S. Non-thesis – Pre-approved list](#) of classes and not already reported elsewhere on the EME checksheet.

- EME 596 (Paper-based) 3 credits
Course List 1:

EME M.S. Non-thesis – Pre-approved list of classes

All EME Core Courses:
EME 501(3): Design Under Uncertainty in EME Systems
EME 511(3): Interfacial Phenomena in EME Systems
EME 521(3): Mathematical Modeling of EME Systems
EME 531(3): Thermodynamics in EME Systems
EME 551(3): Safety, Health, and Environmental Risks in EME Production

Any course within EME Graduate Option list:
CHE 510(3): Surface Characterization of Materials (FSc option)
CHE 536(3): Heterogeneous Catalysis (FSc option)
CHE 544(3): General Transport Phenomena (FSc option)
CHE 546(3): Transport Phenomena II (FSc option)
ENNEC 540(3): Economic Analysis of Energy Markets (ESysE option)
EME 522(3): Computational Methods for Electric Power Systems Analysis (ESysE option)
EME 526(3): Solar Utility and Portfolio Management (ESysE option)
EME 527(3): Stochastic Modeling of Spatial Variability in Energy and Environmental System (ESysE option)
EME 570 (MATSE 570) (3): Catalytic Materials (FSc option)
FSC 503(3): Analytic Methods in Fuel Science (FSc option)
FSC 504(3): Problems in Fuels Engineering (FSc option)
FSC 506(3): Carbon Reactions (FSc option)
IE 505(3): Linear Programming (ESysE option)
IE 516(3): Applied Stochastic Processes (ESysE option)
MNG 541(3): Surface Mine Equipment Selection Anal. (MMPE option)
MNG 554(3): Rock Mechanics Design (MMPE option)
MNG 512(3): Mineral Property Evaluation (MMPE option)
MN PR 505(3): Particle Separation (MMPE option)
MN PR 507(3): Hydrometallurgical Processing (MMPE option)
PNG 501(3): Flow in Porous Media (PNGE option)
PNG 502(3): Coupled Flow and Deformation in Porous Media (PNGE option)
PNG 512(3): Numerical Reservoir Simulation (PNGE option)
PNG 518(3): Design of Miscible Recovery Projects (PNGE option)
PNG 520(3): Thermodynamics Hydrocarbon Fluids (PNGE option)
PNG 526(3): Well Stimulation (PNGE option)
PNG 530(3): Natural Gas Engineering (PNGE option)
PNG 555(3): Unconventional Resources Analysis (PNGE option)
PNG 566(3): Reservoir Characterization (PNGE option)
PNG 577(3): Production and Completions Eng. (PNGE option)
PNG 597(3): Special Topics (PNGE option)

Other non-EME/non-option courses:
AEREC 510(3): Econometrics I
AEREC 511(3): Econometrics II
AEREC 512(3): Applied Microeconomic Theory I
AEREC 529(3): Applied Welfare Economics
CHE 524(3): Chemical Engineering Applications of Thermodynamics
CHE 576 (CE 576) (3): Environmental Transport Processes
EMCH 524A(3): Mathematical Methods in Engineering
IE 525(3): Convex Optimization
STAT 501(3): Regression Methods
STAT 502(3): Analysis of Variance and Design of Experiments
STAT 515(3): Stochastic Processes and Monte Carlo Methods
STAT 540(3): Statistical Computing
STAT 557(3): Data Mining I

& Up to 6 credits of 400-level undergrad courses (please seek prior review from AHGE for selecting UG courses)

Registration requirements. M.S. students holding assistantships register for 12 credits in both the fall and spring semesters. Normally, M.S. students having departmental financial support do not register in the summer but are paid a summer assistantship. Occasionally some elective courses may be offered during the summer session, and so students should consult their advisers to see if they should register. M.S. students are not required to be registered in the semester they defend their theses/paper or in order to make minor revisions to their theses/papers.

3.2 Thesis and Thesis Research

The thesis, normally less than 100 pages in length, is written on a topic approved by the student's adviser. This thesis is read by the student’s committee, and it is approved by the Associate Head of the Graduate Program. By writing an acceptable M.S. thesis, students demonstrate that they are capable of completing a well-defined, directed study of a limited problem and are capable of writing a relatively brief, coherent report summarizing the major objectives and results of the study.

Because the entire Masters program should take only two years to complete, it is paramount that a student begins work on the thesis research as soon as possible, but certainly before the end of the first year of study. In the first semester of residence, it is the responsibility of each student to determine which of the faculty members might be willing to serve as a thesis adviser. The student’s committee is an important resource to help the student find a research topic. Students should not expect the faculty to come looking for them.

The thesis must be written according to the formatting and style guidelines discussed in the Thesis Guide that is available from the Graduate School. There are three thesis submission deadlines that must be met:

1. Intent to Graduate (typically very early in the semester, done on LionPATH)
2. Thesis format review (typically within about 6 weeks after the semester start)
3. Submission of signed, archival copy of the thesis (typically 1 month before graduation)

Students who do not meet these deadlines will be removed from the graduation list by the Graduate School. It is incumbent on any student who has missed a deadline to get in touch with the Graduate Program Assistant, in the Meteorology and Atmospheric Science Department, Main Office, 501A Walker Building.
To help students prepare their theses, the Graduate Communication Enhancement Program (Graduate Writing Center) schedules a number of workshops for M.S. and Ph.D. students. Topics of these workshops include: 1) Editing Your Writing for Grammar and Style, 2) Basic Principles of Technical Writing in English, and 3) Developing Your Written Expression in English.

The English Department offers a course for thesis writing: ENGL 511 – Thesis Workshop and Professional Writing. ENGL 511 is designed for graduate students who are native speakers of English and who are writing or will soon begin to write their dissertations and theses. The course focuses on principles of effective writing, including discipline-specific forms of argument, standards of evidence, and documentation, as well as general principles of presentation and style.

The thesis must be approved and signed by the adviser, at least one other committee member who is a member of the Graduate Faculty, and the Department Associate Head for the Graduate Program; only one of the Graduate Faculty members, the thesis adviser, need be in the Department of Meteorology and Atmospheric Science. In special circumstances, approved in advance by the Associate Dean of the Graduate School upon request of the Department Head, the second reader need not be a Graduate Faculty member. Additional readers who are not members of the Graduate Faculty may read and sign the thesis. Such people will be listed as special signatories on the signature page on the thesis. These people may not be used as substitutes for the above three required Graduate Faculty readers.

### 3.3 Paper Option

The paper, normally less than 20 pages in length, is written on a topic approved by the student's adviser and read by the student’s three-person departmental committee that is composed of the adviser and at least one other member of the Graduate Faculty of the university. The topic need not be original and may be a review of the literature on a particular topic or it may be a suitably extended term paper from a graduate meteorology course. The paper should have a title page and signatory page that has the same form as that signed for an M.S. thesis. The Graduate School does not review the paper. The final, corrected Masters paper must be submitted to the department -- not the Graduate School -- in electronic format by the same deadline as that for the final version of a thesis. Students must register for 2 credits of METEO 596 under their adviser in the semester they write the paper.

### 3.4 Defense

All M.S. students defend their research in a 30- to 50-minute seminar that is normally given one to two weeks prior to the final submission of the thesis or paper. The penultimate thesis or paper draft must be distributed to the student’s committee early enough that the committee has time to read the thesis or paper before the seminar is given (allow 1 work day per 10 pages). During the seminar, the audience should limit questions to points of clarification only; after the seminar, there will be ample time for a public discussion of the work. After that public session, the committee may discuss the thesis or paper further with the student. This private session is normally the time that feedback is provided and that the revisions required by the committee are discussed before the student may submit the final thesis or paper draft to the Thesis Office or the department as appropriate.
3.5 Integrated B.S./M.S. Program in Energy and Mineral Engineering (IUG)

The Department of Energy and Mineral Engineering offers an integrated B.S./M.S. program, also called the Integrated Undergraduate-Graduate (IUG) program, that is designed to allow academically superior students to obtain both the B.S. and the M.S. degree in Energy and Mineral Engineering in five years of study. In order to complete the program in five years, students interested in the IUG program in Energy and Mineral Engineering must apply for admission to the Graduate School and the IUG program no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree.

During the first three years, the student will follow the course scheduling of one of the options in the B.S. degree, normally the Energy and Mineral Engineering or the General Option (see the Undergraduate Bulletin). Students who intend to enter the IUG program are encouraged to take upper level classes during their first three years whenever appropriate. However, students must sequence their courses so all undergraduate degree requirements are fulfilled before taking courses to count solely towards the graduate degree. By the end of the junior year, students normally apply for admission to both the IUG Program and to the Graduate School. Acceptance decisions will be made prior to the beginning of the senior year and M.S. advising committees appointed for successful applicants. During the senior year, IUG students follow the scheduling of the selected B.S. Energy and Mineral Option, with an emphasis on completing 500-level course work as appropriate. At the same time, IUG students will start work on their theses or papers that are designed to meet the requirements of the M.S. degree in Energy and Mineral Engineering. During the fifth year, IUG students take courses fulfilling the departmental M.S. degree requirements and complete their M.S. theses. If a student cannot continue in the integrated program, then this student will be able to receive the undergraduate degree upon completion of all of the B.S. requirements.

Section 4. Degree Requirements - Ph.D.

4.1 Summary of Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the Graduate Bulletin.

Studies for the Ph.D. degree are designed to accommodate the interests and capabilities of the candidate, and they are overseen by a doctoral committee, which also administers comprehensive and final oral examinations. Before being admitted to Ph.D. candidacy, a student must have the academic support of a faculty member and the student must pass the Ph.D. Qualifying Examination. The exam must be taken within three semesters (excluding summer sessions) of entry into the doctoral program. If a student does not pass the exam on their first attempt, then a second attempt may be allowed at the discretion of the graduate faculty members of the Department.

In addition, Ph.D. degree requirements include successful completion of the following: approved graduate course work, English Competence requirements, a comprehensive examination, and a final oral examination (the dissertation defense). The student must pass the English competency exam before scheduling the comprehensive exam. To earn the Ph.D. degree, doctoral candidates must write a dissertation that is accepted by the doctoral committee, the head of the graduate program, and the Graduate School. The Ph.D. program in Energy and Mineral Engineering requires completing a
minimum of twelve (12) post-M.S. course credits, which must include the completion of all minimum core and option (if any) course requirements, and twelve (12) research credits. For students without an M.S. degree, 24 additional course credits must be taken to complete a total of 36 course credits and 48 credits total overall. At least 18 credits of these must be at the 500 or 600 level. A student’s Ph.D. committee can require additional course work based on the student’s background and research plans.

All Ph.D. students must take at least one (1) course (3 credits of core courses) from the following list of prescribed (core) courses. Ph.D. students without an M.S. are required to take three (3) courses (9 credits of core courses) from this list:

- EME 501 Design Under Uncertainty in Energy and Mineral Systems
- EME 511 Interfacial Phenomena in Energy and Mineral Systems
- EME 521 - Mathematical Modeling of Energy and Mineral Systems
- EME 531 Thermodynamics of Energy and Mineral Systems
- EME 551 Safety, Health and Environmental Risks in Energy and Mineral Production

All Ph.D. students who select an option must select 12 credits from their option:

<table>
<thead>
<tr>
<th>Energy Systems Engineering (ESysE)</th>
<th>Fuel Science (FSc)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EME 522 (3) Computational Methods for Electric Power Systems Analysis</td>
<td>CHE 544 or CHE 546 (3) General Transport Phenomena Transport Phenomena II</td>
</tr>
<tr>
<td>EME 523 (3) Stochastic Optimization Methods of Energy and Environmental System</td>
<td>EME 570 or CHE 536 (3) Catalytic Materials Heterogeneous Catalysis</td>
</tr>
<tr>
<td>EME 526 (3) Solar Utility and Portfolio Management</td>
<td>FSC 504 (3) Problems in Fuels Engineering</td>
</tr>
<tr>
<td>EME 527 (3) Stochastic Modeling of Spatial Variability in Energy and Environmental Systems</td>
<td>FSC 506 (3) Carbon Reactions</td>
</tr>
<tr>
<td>IE 505 (3) Linear Programming</td>
<td></td>
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<tr>
<td>IE 516 (3) Applied Stochastic Processes</td>
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<table>
<thead>
<tr>
<th>Mining and Mineral Process Engineering (MMPE)</th>
<th>Petroleum and Natural Gas Engineering (PNGE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MNG 512 (3) Valuation of Mineral Properties and Mining Projects</td>
<td>PNG 501 (3) Flow in Porous Media</td>
</tr>
<tr>
<td>MNG 541 (3) Surface Mine Equipment Selection Analysis</td>
<td>PNG 502 (3) Coupled Flow and Deformation in Porous Media</td>
</tr>
<tr>
<td>MNG 554 (3) Rock Mechanics Design</td>
<td>PNG 512 (3) Numerical Reservoir Simulation</td>
</tr>
<tr>
<td>MNPR 404 (3) Particle Separation</td>
<td>PNG 518 (3) Design of Miscible Recovery Projects</td>
</tr>
<tr>
<td>MNPR 507 (3) Hydrometallurgical Processing</td>
<td>PNG 520 (3) Thermodynamics of Hydrocarbon Fluids</td>
</tr>
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<td>PNG 526 (3) Well Stimulation</td>
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<td>PNG 530 (3) Natural Gas Engineering</td>
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<td></td>
<td>PNG 555 (3) Unconventional Resources Analysis</td>
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<td></td>
<td>PNG 566 (3) Reservoir Characterization</td>
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<td></td>
<td>PNG 577 (3) Production and Completions Engineering</td>
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<td></td>
<td>PNG 597 (3) Special Topics (when taught, may be used to partially satisfy the PNGE option minimum credit requirement)</td>
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<td></td>
<td></td>
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<tr>
<td></td>
<td>PNG 596 (3) INDIVIDUAL STUDIES MAY NOT BE USED WITHIN THIS OPTION.</td>
</tr>
</tbody>
</table>
**Dissertation.** Students will complete a dissertation, normally less than 200 pages in length, on an original topic that is approved by the student's adviser and Ph.D. committee, read by the committee, and approved by the Associate Head of the Graduate Program. By writing an acceptable Ph.D. dissertation, students demonstrate that they are capable of completing a well-defined, self-directed study of a new problem and are capable of writing a relatively brief, coherent report summarizing the major objectives and results of the study. The dissertation work must be of publishable quality.

**Registration requirements.** Students must register continuously in the fall and spring semesters up to and including the semester or session in which the Final Oral Exam is passed. Summer session registration is not required unless a student is taking a Comprehensive or Final Oral Exam in that session. Active off-campus students who have passed their Qualifying Exam and who have satisfied the two-semester full-time residence requirement need only register each fall and spring semester.

After passing the Comprehensive Exam, a student will normally register in the fall and spring for the noncredit course EME 601 (Thesis Preparation, full-time)

If a Ph.D. student will not be in residence for an extended period for compelling reasons, then the Senior Associate Dean of the Graduate School will consider a petition for a waiver of the continuous registration requirement. This petition must come from the doctoral committee chairperson and must carry the endorsement of the Department Head or the Associate Head of the Graduate Program.

**Residency requirement.** The University residency requirement is that each student must spend at least two consecutive semesters, exclusive of summer sessions, as a registered full-time student engaged in academic work at the University Park Campus. The residency requirement can be completed at any time after a student has been admitted to the Ph.D. program.

**Degree completion requirement.** The Ph.D. degree must be completed within eight years of admission to candidacy (i.e., passing the Qualifying Exam) and within six years of passing of the Comprehensive Exam.

**4.2 Composition of Doctoral Committees**

A student’s Dissertation Committee shall be nominated to the Graduate School by the student’s major Graduate Program Head as soon as possible after passing the Ph.D. Qualifying Exam. A student’s Dissertation Committee shall consist at minimum of four members of the Graduate Faculty, each of whom shall be in a position to contribute substantially to the student’s education (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/gcac-602-phd-committee-formation/). At least two Committee members shall be from the student’s major graduate program (i.e., Energy and Mineral Engineering). At least one Committee member must be a Graduate Faculty member from outside of the Department of Energy and Mineral Engineering. Dissertation Committees may also include other participants who are not members of the Graduate Faculty but are otherwise qualified and have particular expertise in the student’s research area.

For students pursuing a graduate minor, the Dissertation Committee shall include a Minor Field Member representing each graduate minor. For students pursuing dual-title degrees, either the Dissertation Committee Chair or a co-Chair must be a Graduate Faculty member of the dual-title program.
The Graduate Program Head can consult with the student and the student’s adviser on the composition for the committee. The Graduate Program Head is also responsible for nominating non-PSU members of the Dissertation Committee to the Graduate School, and ensuring appropriate Dissertation Committee composition that is in the best interests of the student and the completion of their dissertation.

The Dissertation Committee shall meet with the student no less than annually to assess student progress toward the degree.

4.3 Qualifying Exam Format and Procedure

Overview:
Policy GCAC-604, adopted by the Graduate Council, requires the successful completion of the qualifying exam as part of Doctoral degree at Penn State. The full policy can be viewed here. Accordingly, acceptance into the Ph.D. degree program in the John and Willie Leone Family Department of Energy and Mineral Engineering (EME) will be based on the student’s performance on the Ph.D. qualifying examination administered by the Graduate Faculty of the EME graduate program. The qualifying exam will be scheduled twice a year (once in Fall and once in Spring) and overseen by members of the qualifying examination committee (4 – 9 EME faculty), which is chaired by the EME graduate officer.

Objective:
As described in GCAC-604, the primary purpose of the qualifying examination is to provide an early assessment of whether the student has the potential to develop the knowledge, skills, and attributes the program has defined in its formal Learning Objectives, including evidence of critical thinking skills, necessary for a successful researcher in the disciplinary field.

a) The qualifying examination is conducted early in a student’s program to ensure that the considerable investment of time, resources, and effort required by the student has a high likelihood of leading to completion of the Ph.D.

b) Additionally, the qualifying examination may assess if the student is well-grounded in the fundamental knowledge of the discipline.

Conflicts of Interest:
As described in GCAC-604, conflict of interest in administering the qualifying examination must be avoided. For students whose dissertation adviser has already been identified at the time of the qualifying examination, the adviser may not take part in the design of the written examination, review of the written proposal, and evaluation of the oral discussion.

Requirements:
- Students are required to take the qualifying exam within three semesters of being admitted to the Ph.D. program.
- Students must have completed at least 18 credits towards their Ph.D. degree before the first attempt.
- Failure to schedule the exam before the start of the fourth semester of the doctoral program (summer sessions not counted) will be treated equivalently to the student having taken the qualifying exam and failed.
- Students are allowed a maximum of two attempts to pass the qualifying exam.
- Students are permitted to re-take the qualifying exam within the following two semesters of a failure verdict.
Dates for Spring 2022:

- Written proposal is due on Sunday, March 20, at 11:59 PM
- Written exam will be held on Monday, March 21, at 9 AM – 1 PM
- Oral discussion will be held on Thursday and Friday, March 24 and 25
Qualifying Exam Format and Grading:
The EME Qualifying Exam consists of the following components:

1. **Proposal: Maximum 50 points**
   - **Part (a): Written Five-Page Proposal, Completed in advance – Maximum 25 points**
     - **Objective:** Show ability to frame a research question and written communication skills.
     - **Grading:** Written proposal will be graded anonymously and scored independently (each student is assigned a confidential letter code) by at least three faculty using a rubric (see attached). Faculty scores will be averaged.
   - **Part (b): Oral Discussion, 30 – 45 minutes – Maximum 25 points**
     - **Objective:** Demonstrate ability to explain a research question using oral communication skills and English language proficiency check.
     - **Grading:** The discussion part will be scored independently by at least three faculty using a rubric (see attached). Faculty scores will be averaged.

2. **Written Examination: Maximum 50 points**
   - **Objective:** Demonstrate fundamental knowledge and critical thinking in two areas relevant to EME.
   - **Grading:** Each student must answer a maximum of five questions in four hours. Each question will be scored 0-10 (10 is best). The written examination will be graded anonymously (Each student is assigned a confidential letter code).

**Total Score: Maximum 100 points**
The average score on the written proposal, the sum of scores on written exam questions, and the average score of the oral exam.

**Pass: requires a total score of 70 or higher**
- If based on the total score, the outcome is FAIL on the first attempt, the student MUST retake ALL parts of the exam on the second attempt.
- If based on the total score, the outcome is FAIL on the second attempt, the student may not continue in the EME Ph.D. program.

**English Language Proficiency**
Graduate programs are required to separately report to the graduate school a PASS/FAIL outcome for English language proficiency. Since students’ English Language Proficiency in both oral and written aspects are checked in the qualifying exam, the outcome of the qualifying exam (PASS/FAIL) will be reported for “English Proficiency/Fluency.”

**Written Exam Format:**
The written exam consists of questions in four topic areas relevant to the EME Core Courses: (1) Mathematics, (2) Chemistry and Interfacial Phenomena, (3) Thermodynamics, and (4) Optimization and Stochastic Simulation.
- The written exam is closed book and note, and its duration is four hours.
- Students select two topic areas (primary and secondary) in advance from the list above.
- Students must answer a TOTAL of five questions drawn from the two selected topic areas.
- The first five questions will be graded if more than five questions are answered.
4.4 Comprehensive Exam

The Comprehensive Exam consists of a written component and an oral component. The written component consists of a written prospectus and a written exam. Students are strongly encouraged to take the Comprehensive Exam within 12 months of passing the Qualifying Exam.

A dissertation prospectus is a document that provides a road map for the proposed dissertation. The student must write a prospectus describing a plan for future research, which should include an introduction that motivates the research by noting gaps of knowledge in the field, key research questions to be addressed, a brief summary of proposed methodology, a summary of work completed to date, and a schedule of milestones. There is no strict word or page limit, although a guideline of approximately 8000 words (roughly a 15-page document) is noted. The prospectus should be sent to the committee at least two weeks prior to the written exam date.

The written exam primarily covers material related to the proposed dissertation topic, and it is written and evaluated by the Ph.D. Committee members. Each committee member prepares a “question,” which can be multi-part, for the student, indicating what resources may be used to answer the question (e.g. books, notes, electronic resources, internet, etc.). The general target is 1–2 hours per question, and the total length for the written exam should not exceed 8 hours. Questions are submitted to the advisor, who prepares the final set of questions and administers the exam to the student one to two weeks prior to the oral exam. Question responses are then shared back to the committee before the oral exam.

The oral component begins with a public research presentation by the student (30–40 minutes in length) that covers aspects of the proposed dissertation work including research they have done and research they intend to pursue. The public presentation is followed by a short public Q&A session.

The committee asks the student to step out of the room and confers briefly to plan the closed session. The student is then invited back into the room and asked questions from the committee members in a closed session lasting from 45–120 minutes. The student then leaves the room, and the committee discusses the student’s performance (on both the oral and written components) and votes. At least 2/3 of the committee must vote in favor of passing the student for the student to have passed the exam. The student is then informed of the outcome of the vote.

4.5 Thesis and Final Oral Exam

All Ph.D. candidates must write a dissertation. The topic of the study must be original and must be developed in large part by the student. A typical dissertation is 100 to 200 pages in length and should be completed within two years after a student has passed the Ph.D. Comprehensive Exam.

The dissertation must be written according to the formatting and style guidelines discussed in the Thesis Guide that is available from the Graduate School. There are three thesis submission deadlines that must be met:

1. Intent to Graduate (typically very early in the semester, done on e-lion)
2. Thesis format review (typically within about 6 weeks after the semester start)
3. Submission of signed, archival copy of the thesis (typically 1 month before graduation)
Students who do not meet these deadlines will be removed from the graduation list by the Graduate School. It is incumbent on any student who has missed a deadline to get in touch with the Graduate Program Coordinator, Department of Energy and Mineral Engineering, 103 Hosler Building.

Once completed in manuscript form, the dissertation is given to the student's Ph.D. Committee whose members read it and then administers a Final Oral Exam, or thesis defense. The committee members must have copies of the completed dissertation at least two weeks prior to the scheduled defense date. Once the Final Oral Exam is scheduled with the committee, the student must inform the Graduate Staff Assistant. The Graduate Staff Assistant then will notify the Graduate School, at least two weeks prior to the exam, in the same way that the Comprehensive Exam was scheduled.

There must be at least three months between the Comprehensive and Final Oral Exams. All Final Oral Exams begin as special departmental seminars that are open to all available faculty and graduate students of the department. This seminar is a formal, scholarly one and should be conducted as would be a seminar for a job interview. Typically, this seminar is scheduled first and then the student's committee and other interested faculty meet with the student after the seminar to ask any additional questions. This committee then decides whether a student passes the exam; as for the Comprehensive Exam, at least 2/3 of the committee must vote in favor of passing the student for the student to have passed the exam.

4.6 International Graduate Students

International students who are or may be on teaching assistantships must take the American English Oral Communicative Proficiency Test (AEOCPT) before the commencement of classes. Typically, this test is administered during the orientation program for incoming international students.

Scores range from 0-300. Effective August 1999, a score of 250 or higher allows an international student to assume teaching responsibilities with no restrictions.

Scores under 250 require additional coursework in English. The following scores and interpretations constitute the guidelines followed by the Department of Applied Linguistics.

<table>
<thead>
<tr>
<th>AEOCPT Score</th>
<th>Required Course</th>
<th>Prognosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>250-300</td>
<td>None</td>
<td>Student may assume teaching duties with no restrictions.</td>
</tr>
<tr>
<td>200-249</td>
<td>Enroll in ESL 118G before assuming teaching duties.</td>
<td>Students enrolled in ESL 118G must pass the qualifying exit examination, called the Interactive Performance Test (IPT), before they can assume teaching duties with no restrictions.</td>
</tr>
<tr>
<td>150-199</td>
<td>Enroll in ESL 117G</td>
<td>Will require at least two semesters before student is recommended to teach.</td>
</tr>
<tr>
<td>&lt;150</td>
<td>Enroll in ESL 115G</td>
<td>Will require at least three semesters before student is recommended to teach.</td>
</tr>
</tbody>
</table>
The Department of Applied Linguistics schedules the required courses for the student

International students must complete their program of study (M.S. or Ph.D.) by the date issued on their I-20s. If they are unable to do so, then they must seek an extension on their I-20s by contacting the University Office of Global Programs (UOGP) in Boucke Building (4th floor). In addition to the above constraint, the Department of Meteorology and Atmospheric Science has additional deadlines. Students who graduated from Penn State with M.S. degrees in meteorology are given four years to complete their Ph.D. from the time they completed their M.S. degrees. Students who graduated from Penn State with M.S. degrees from departments other than meteorology or who obtained M.S. degrees from different institutions have five years from the time they began their studies in the Department of Meteorology and Atmospheric Science at Penn State. Finally, students who do not have M.S. degrees have six years.

Normally, a student will no longer be allowed to continue graduate study if competency is not demonstrated on a second examination

Section 5. Assistantships and Fellowships

Most students in the department are supported through either a teaching or research assistantship according to the needs of the department. Applicants to the department are considered also for college and university fellowships; a student granted such a fellowship is free to pursue an intensive year of studies without any of the additional duties that are associated with an assistantship.

An assistantship appointment for each student is granted on a semester-by-semester basis after the first academic year. Normally, students who maintain regular academic status and who make adequate progress toward completing their degrees can expect continued support. Students who are receiving continued support each semester must sign a university Terms of Offer of a Graduate Assistantship form that is signed by the adviser (for research assistantships) or the Department Head or the Associate Head of the Graduate Program (for teaching assistantships). Also, the department via the student's adviser will inform the student in writing, after meeting with the student, if financial support is being terminated.

Students holding teaching assistantships and who are making satisfactory progress toward their degree may be appointed at Grade 12 each fall and spring semester. Students who hold teaching assistantships and who also have research advisers with adequate funds, however, may have their salaries incremented by their research advisers from a Grade 12 salary to the highest-grade level for which they qualify at that time.

An assistantship may be terminated if the student blatantly disregards departmental or Graduate School rules, such as the one limiting credit loads per semester, or if the student's program is terminated for unsatisfactory scholarship.
5.1 Teaching Assistantships

Teaching assistantships may be available in the fall and spring semesters for new students who have adequate backgrounds in energy and mineral engineering or in a related field, and for more senior energy and mineral engineering graduate students, regardless of their undergraduate backgrounds. Students supported by teaching assistantships are involved with teaching of energy and mineral engineering regular and laboratory classes for undergraduate courses, grading problems and exams for instructors, holding office hours.

It is Earth and Mineral Science College policy that no graduate student for whom English is a second language may serve as a teaching assistant or may conduct laboratories until he or she has received an NR (No Restriction) rating from the Department of Linguistics. All incoming students are scheduled by the Graduate Assistant to take the test American English Oral Communicative Proficiency Test. Students who do not receive an NR rating may take some or all of the English as second language courses: ESL 115G, 117G, or 118G.

5.2 Research Assistantships

Research assistantships support students as they work on their thesis research. These assistantships, unlike teaching assistantships, are usually funded by outside sources. The professor or professors who have obtained the funding from a particular agency for a given project supervise them. Consequently, the availability of funds for support of new students depends on the success the faculty has had in obtaining research grants. Two years is considered to be the normal duration of a research assistantship for an M.S. student.

5.3 Fellowships

The Graduate School, the College of Earth and Mineral Sciences (EMS), and the EME Department each award a limited number of fellowships to scholastically outstanding students that meet specific fellowship requirements. Fellows may not accept employment during the periods of their appointments, nor are they required to render any service to the University. Fellows receive stipends that vary with the particular award and usually receive grants-in-aid for tuition. For incoming students, the graduate admission application serves as the fellowship application. The University Fellowships Office maintains a searchable compilation of available external fellowships.

Students granted fellowships should carry the same credit loads as those holding regular assistantships except in the summer. Full-time graduate fellows are also required to have medical insurance. Normally and if funds are available, students who are making satisfactory progress will be awarded assistantships once their fellowships expire.

5.4 STAP (Summer Tuition Assistance Program)

The Summer Tuition Assistance Program provides tuition assistance to graduate students who have had assistantships, fellowships, or traineeships for the two preceding semesters (ex.Fall 2019 and Spring 2020) in order to continue graduate studies during the Summer.
Please review the following eligibility criteria and attached EME STAP Policy/FAQ document before applying. You may also, visit the following STAP link for more information: https://secure.gradsch.psu.edu/stap/

**Eligibility Criteria:**

**Graduate students must meet at least one of the following:**
Appointed through the University on a teaching or research assistantship -- Fall 2020 AND Spring 2021 (for a maximum tuition award of nine credits during summer).
Appointed through the University on a graduate fellowship or traineeship -- Fall 2020 AND Spring 2021 (for a maximum tuition award of nine credits during summer).

**Course Requirements:**

Students must register for appropriate course work or research credits. Courses that qualify for STAP are limited to:

- Those that may be applied towards the credit requirements for a graduate degree (i.e., courses at the 400-level or above).
- English as a Second Language (ESL) skills courses required for international graduate students.
- Foreign language skills courses required by the student's program (resident instruction only).
  - In all cases, courses must be required and approved by the student's graduate program.
  - No "hobby courses"

**Students will be billed for audits, which cannot be used to satisfy degree requirements, and unapproved registrations.**

Continuing Education, and Conference & Institutes courses are not STAP eligible. STAP is intended to cover resident and World Campus instruction course work. International students are limited to three World Campus credits (per World Campus policy).

**5.5 Tax Withholding**

All students on assistantships must file a W-4 form with the Payroll Office at the time their assistantships begin. Current withholding information is printed on both the check stub and the remittance advice for direct deposit. Students having questions may contact the Payroll Office in 101 James M. Elliot Building, at (814) 865-7621, or may send e-mail to payroll@psu.edu. W-4's are available from the Payroll Office, the Payroll window at the Office of the Bursar, and the department office, or they may be printed from the web https://controller.psu.edu/payroll-office/forms

**When students fall below half-time student status,** i.e., in the summer when not taking classes, they are no longer exempt from Social Security and Medicare (FICA) taxes. When budgeting, students should plan accordingly.
When a student leaves Penn State, that student must file a new W-4 form so that Penn State has an address on file to send the W-2 for the current tax year. When filling out a new W-4 form, it is important that the student completes the entire form. Whatever information is supplied on this form will replace the current information on file, including blanks. The IRS requires that if the withholding information is left blank, then Penn State must withhold at the rate for "SINGLE" (this is the highest withholding rate) and cannot allow any withholding allowances.

5.6 State and Local Taxes

No state and local taxes are withheld for students on graduate research assistantships during the academic year, per University standards. All summer appointments are taxable, however.

5.7 Tuition Grant-in-Aid

The Graduate School Tuition Grant-in-Aid provides payment of a student's tuition. For the most part, assistantships and fellowships cover tuition as well as a monthly stipend. If tuition is not covered by funds, then graduate degree or certificate students (non-degree students are not eligible) may apply during or after their second semester at the University for a tuition grant-in-aid. Recipients are selected on the basis of demonstrated financial need. The Grant-in-Aid is intended primarily to provide temporary assistance, and will not be given for more than two semesters. Preference is given to applicants who have one semester of coursework remaining.

Application forms can be picked up at 114 Kern. The person in charge of the applicant’s graduate major must endorse each application. A copy of the applicant's Penn State transcript is required (unofficial transcripts are acceptable; grade slips are not acceptable).

Section 6. Departmental Courses

Energy and Mineral Engineering course descriptions can be found in LionPath.

Section 7. Student Organizations

There are a number of organizations in the Department, College, and University in which students are encouraged to participate. Several of these are discussed below. Also presented are summaries of elected positions that graduate students are expected to fill.

7.1 American Association of Drilling Engineers

The purpose of the American Association of Drilling Engineers is to form a gateway between our members and the drilling engineering aspect of the petroleum and natural gas industry.

7.2 American Solar Energy Society

The Penn State American Solar Energy Society (ASES) is a student chapter of the national ASES organization. Our mission is to advance all things solar at Penn State and around the community. Our parent organization is supported by more than 8,000 energy professionals and grassroots supporters. With the Penn State Chapter included, ASES has regional chapters in 40 states across the U.S.
The need for renewable energy is clear. Fossil fuels are putting the U.S. economy and environment at risk. Energy costs are volatile. Pollution and climate change threaten our children’s future. Even the security of our nation is at risk as the U.S. continues to buy fuel from turbulent regions. The time for change is now.

7.3 Society of Environmental System Engineers

The Society of Environmental Systems Engineers objectives are:

- To publicize Environmental Systems Engineering to industry, corporations, and the Penn State Community
- To encourage student engagement in activities of SESE
- To enhance professional development through industry and government speakers, field trips and tours, faculty/student interaction, and career development events
- To inform undergraduate students about the purpose of an ENVSE degree

7.4 Mine Rescue Team

The purpose of this organization is to give students an understanding for the work of a mine rescue team by giving them practical experiences. The organization will also try to impart in students the responsibility that comes with being a member of a safety team that has the responsibility of possibly saving lives. Lastly, the club will teach proper safety steps to take in case of a mine emergency

7.5 Society of Petroleum Engineers

The Society of Petroleum Engineers (SPE) is affiliated with the Petroleum and Natural Gas Engineering degree program in the John and Willie Leone Family Department of Energy and Mineral Engineering in the College of Earth and Mineral Sciences. Currently, we have approximately fifty undergraduate and graduate members enrolled in our chapter. We provide:

- Mentoring of freshmen and sophomores
- Leadership skills training
- Help with resumes
- Extracurricular involvement
- Qualified students who have been exposed to the society through our mentoring program to fill offices

7.6 University Graduate and Professional Student Association (GPSA)

The mission of The Pennsylvania State University Graduate and Professional Student Association (GPSA) is to represent and support the interests of the University’s current and future graduate student community by supporting scholarly activities and providing leadership, service, and social opportunities. GPSA exists to enrich the experience of the University’s graduate students, all of whom are members of GPSA. GPSA accomplishes these objectives by flexibly responding to the changing collective needs of its primary constituents—graduate students. GPSA, recognized by the University as the graduate students’ central organization, is appropriately organized to accomplish the following unique functions:
- advocate the position of the graduate student body to other University and external constituencies
- represent the broad interests of graduate students to the University’s academic units through a network of departmental delegates
- furnish accessible, reliable, and valuable information, services, and programs to current and prospective graduate students
- provide a forum for interaction among an extraordinarily diverse graduate student population
- encourage and facilitate communication with and interaction among other graduate student organizations
- seek funding to support organizational activities
- promote a sense of community among graduate students and their families.

7.7 Graduate Earth and Mineral Sciences Graduate Student Council

The graduate student council is a group of representatives from the 5 departments of the College of Earth and Mineral Sciences. The Graduate Student Council's purpose is to advocate in the best interests of the graduate student body as a whole and to facilitate the implementation of policies deemed beneficial to the graduate student population. Further, the council will foster collaboration of ideas and policies between the various departments within the college. The Council is dedicated to making improvements, wherever needed, as voiced by the graduate students of the college.

7.8 Annual Graduate Research Exhibition

The Graduate Exhibition celebrates research in all its aspects as an essential and exciting part of graduate education at Penn State. Established in 1986, the Graduate Exhibition places special emphasis on communicating research and creative endeavor to a general audience and offers an unusual opportunity for professional development by challenging graduate students to present their work in clear, comprehensible terms to people outside their fields.

The Graduate Exhibition is also a rare opportunity for graduate students to see themselves as part of the larger University community, to share their creativity, and to appreciate the breadth of quality research being done at Penn State. Each year, graduate students throughout the University are invited to participate.

The Graduate Exhibition is held on Penn State's University Park campus and includes music and theatrical performances, a visual arts display, and poster exhibits of students' research. All events are free and open to the public. Please visit their website for more information.
Section 8. Departmental Policies

Writing a coherent document explaining departmental policy is difficult. Subtleties in the circumstances can dramatically change how both a graduate student and the administrative staff handle a certain situation. The department's administrative and support staff are excellent and know these subtleties. Some of these departmental policies are available on the web; in other cases, it is best to consult with the person on staff who handles these matters before you take action.

8.1 Travel

When planning a trip that is being funded or reimbursed by any source other than from your personal finances, it is imperative that you work directly with the front office staff as soon as you are aware of your trip. All travel is required by university policy to be handled in a specific manner. Failure to follow this procedure may inhibit reimbursement. International travel requires students to register with PSU’s Travel Safety Network 60 days prior to departure.

8.2 Purchasing

The Graduate Program in Energy and Mineral Engineering does not have any resources to provide graduate students with computers, computer equipment, office equipment, or laboratory supplies. If you need equipment or supplies related to your education or for your office, you must work with your advisor, and they may make purchases if they have an appropriate budget.

8.3 Computing

Any computer questions or issues should be emailed to helpdesk@ems.psu.edu

8.4 Moving Furniture/Offices

Office desks are assigned and you may not move spaces or rooms unless getting approval from the EME Graduate Office. All furniture in each office should remain in its current area.

8.5 Facility Maintenance

Please e-mail EME Graduate Office concerning any problems with your office (e.g. bad door jams, electrical outlets). They will contact the Office of Physical Plant (OPP) to resolve the problem.

If you are in the building after normal business hours and there is a facility problem that requires immediate attention (e.g. overflowing toilets, burst pipes), please contact OPP directly at 814-865-4731.
9. Personal Well-Being

9.1 Physical and Mental Health

- Life Hacks with CAPS
- CAPS’ Community Provider Database
  Please use this resource to search for private mental health care providers in the communities surrounding Penn State campuses.
- CAPS Chat
- Commonwealth Campuses Counseling Services
- Wellness Self-help Resources

- Campus Safety
- Campus Recreation
- Center for the Performing Arts

Sokolov-Miller Family Financial and Life Skills Center

9.2 Get Involved

- OrgCentral
  Learn more about graduate student organizations by searching the database of student organizations.

9.3 Campus Services

Campus Services

- Transportation
- Parking
- Housing
- Computing
- University Libraries
- Teaching Support
  - Schreyer Institute for Teaching Excellence
  - Teaching and Learning with Technology
- Academic Support
  - English for Professional Purposes Intercultural Center (EPPIC)
  - Graduate Writing Center

9.4 Campus Communities

- LGBTQ+ Community
- Multicultural Resources & Programming
- Gender Equity on Campus
- Religious/Spiritual Community
- Adult Learner & Veteran Community
9.5 Living in State College

- **Finding Off-Campus Housing and Roommates**
  Graduate and professional students can filter housing choices to options that are applicable to graduate/professional students under "More Filters" and "Convenient For" at the bottom of the search criteria options. Graduate students can also search for roommates that are also graduate students.

- **Zagster Bike Share**

- **Local Transportation**
  - University Park Airport
  - Bus
    - CATA Bus
    - RIDEpass
    - Megabus
  - Bikepaths
  - Hiking

- **Community Events**
  - Visit Penn State Event Calendar
  - StateCollege.com Calendar
  - WPSU Community Calendar

9.6 Help and Support

- **Conflict Resolution**
- Health Resources
- Counseling and Psychological Services (CAPS)
- Crisis Services
- University Police and Public Safety
- University Health Services
  - After-hours advice: 24/7 Advice Nurse: 814-863-4463
  - If you need immediate assistance, please call 911
  - Medical Services
  - Schedule an Appointment
  - Health Information & Resources
- Penn State Student Health Insurance Plan
- Leave of Absence policy
- Student Disability Resources
- Student Care and Advocacy
- Student Legal Services
- Resources for Reporting Wrongdoing