

# Department of Mining Engineering

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## Degrees Offered

- Masters of Science, Mining Engineering (M.S.Min.E.)
- Doctor of Philosophy, Mining Engineering (Ph.D.)

## Program Objectives

The objective of the master's of science in mining engineering (M.S.Min.E.) program is to equip students to investigate and develop solutions to advanced mining engineering problems. This program provides students the technical knowledge and research experience needed to address the most challenging contemporary issues within a specialized area of study.

Moreover, the objective of the Ph.D. program in mining engineering is to educate students to the highest level of technical and research performance within the minerals profession. Graduates of this program not only possess the requisite technical skills, but they also have the capability to actively contribute to the scholarly body of knowledge through independent research. These graduates pursue impactful careers in industry, government agencies, and academia.

## Areas of Research

The expertise of the current faculty members broadly spans many traditional mining sub-disciplines. Active research areas include surface and underground mining, rock mechanics and ground control, mine health and safety, mineral/coal processing, mine pollution control, and mine ventilation.

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## FACULTY

### CHAIR

- John A. Herbst - Ph.D. (University of California, Berkeley)  
Mineral Processing, Numerical modeling, Comminution

### PROFESSORS

- Keith Heasley - Ph.D. (Colorado School of Mines)  
Numerical Modeling, Rock Mechanics
- Vladislav Kecojevic - Ph.D. (University of Belgrade)  
Surface Mining, Aggregates Production, Mine Materials Handling Systems

### ASSOCIATE PROFESSOR

- Yi Luo - Ph.D. (West Virginia University)  
Surface Subsidence, Ventilation
- Brijes Mishra - Ph.D. (West Virginia University)  
Rock mechanics, Numerical modeling
- Felicia F. Peng - Ph.D. (West Virginia University)  
Coal Preparation, Coal Utilization, Process Control, Plant Design

### ASSISTANT PROFESSOR

- Aaron Noble - Ph.D. (Virginia Tech)  
Mineral Processing, Flowsheet design, Froth Flotation

### RESEARCH ASSISTANT PROFESSOR

- Mark Sindelar - Ph.D. (University of Pittsburgh)  
Mine power systems

## Admission Requirements

The Masters of science in the mining engineering program admits students who have met the following requirements:

- A grade point average (GPA) of 3.0/4.0 or above from an ABET-accredited B.S.Min.E. program or its equivalent. Additionally, all Ph.D. applicants must have earned an M.S. degree in mining engineering with a GPA of 3.0 or higher. Transfer students must have at least a GPA of 3.0/4.0 for the graduate programs at similar institutions.
- International applicants must submit a GRE score and demonstrate proficiency in communicating English. For applicants whose native language is not English, this requirement may be fulfilled by a TOEFL-pBT test score of 550 or better, or an iBT score of 79, or an IELTS score of 6.5.

- At least three letters of recommendation, one of which must be from the applicant’s previous thesis advisor or an academic equivalent. All letters of recommendation should evaluate the student’s potential for performing independent, masters or doctoral-level research.

The same review process is used for M.S. and Ph.D. applications. In both cases, the completed application packets are circulated to the graduate faculty. Initial evaluations consider whether:

1. The applicant should or should not be accepted; and
2. The reviewing faculty member is or is not willing to provide support.

If multiple positive responses are produced, the assignment of the potential graduate student is resolved at a meeting of the faculty according to specific needs and interests.

## Curriculum in Masters of Science in Mining Engineering

A candidate for the M.S. degree in mining engineering must comply with the rules and regulations as outlined in the WVU Graduate Catalog and the specific requirements of the Statler College and the Mining Engineering Department.

### Program Requirements

All M.S. degree candidates are required to perform research and follow a planned program of study. The student’s research advisor, in conjunction with the student’s Advising and Examining Committee (AEC) will be responsible for determining the plan of study appropriate to the student’s needs. The underlying principle of the planned program is to provide the students with the necessary support to complete their degree and prepare them for their career.

### Curriculum Requirements

A minimum cumulative GPA of 3.0 is required in all courses

#### Course Requirements \*

A minimum of 60% of course must be from 500 level or above

Select from the following based on degree path 24

Any BIOM, CE, CHE, CHEM, CPE, CS, EE, IENG, IH&S, MAE, MATH, MINE, PNGE, PHYS, SAFM, SENG, or STAT courses 400-799

#### Thesis Option - 6 hours

MINE 697	Research (6 hours)	6
Written Research Proposal		
Thesis		
Final Oral or Written Examination		

Total Hours 30

\* Students who do not hold a baccalaureate degree in mining engineering are required to take a set of undergraduate mining engineering courses above and beyond the minimum coursework requirements.

### Final Examination

M.S. students following the thesis or problem report option must prepare a written research proposal. The proposal must be approved by the student's AEC at least one semester prior to the final oral examination.

All students, regardless of option, are required to pass a final oral or written examination, administered by their AEC, covering the thesis or problem report and/or related course material.

### Suggested Plan of Study

The plan below illustrates the Thesis Option. It is important for students to take courses in the order specified as much as possible; all prerequisites and concurrent requirements must be observed. A typical M.S.Min.E degree program that completes degree requirements in two years is as follows.

#### First Year

Fall	Hours Spring	Hours
Course	3 Course	3
Course	3 Course	3
Course	3 Course	3

**Second Year**

<b>Fall</b>	<b>Hours Spring</b>	<b>Hours</b>
Course	3 Course	3
MINE 697	6 MINE 697	6
	9	9

Total credit hours: 36

## Curriculum in Doctor of Philosophy – Mining Engineering

A candidate for the Ph.D. degree with a major in mining engineering must comply with the rules and regulations as outlined in the WVU Graduate Catalog and the specific requirements of the Statler College and the Mining Engineering Department.

### Program Requirements

The doctor of philosophy degree with a major in mining engineering is administered through the college's interdisciplinary Ph.D. program. The research work for the doctoral dissertation must show a high degree of originality on the part of the student and must constitute an original contribution to the art and science of mining engineering.

All Ph.D. degree candidates are required to perform research and follow a planned program of study. The student's research advisor, in conjunction with the student's Advising and Examining Committee (AEC) will be responsible for determining the plan of study appropriate to the student's needs. The underlying principle of the planned program is to provide the students with the necessary support to complete their degree and prepare them for their career.

### Curriculum Requirements

A minimum cumulative GPA of 3.0 is required in all courses

<b>Course Requirements *</b>		
Research		24
MINE 797	Research	
Select from the following based on degree path:		18
Any BIOM, CE, CHE, CHEM, CPE, CS, EE, IENG, IH&S, MAE, MATH, MINE, PNGE, PHYS, SAFM, SENG, or STAT courses 500-799		
<b>Examinations</b>		
Qualifying Exam		
Candidacy Exam		
Final Exam		
<b>Total Hours</b>		<b>42</b>

\* Students who do not hold a baccalaureate degree in mining engineering are required to take a set of undergraduate mining engineering courses above and beyond the minimum coursework requirements.

A minimum of eighteen hours of coursework and twenty-four hours of independent research beyond an M.S. degree are required.

### Examinations

#### QUALIFYING EXAM

All students must take and pass a written qualifying examination. Normally, the qualifying examination is given no later than one semester after completion of eighteen credit hours toward the doctoral degree. . All mining engineering students must pass the written qualifying examination within three semesters since registered in Mining Engineering graduate program. This examination is designed to assess the basic competency of students in the mining engineering field to determine whether or not they have sufficient knowledge to undertake independent research.

#### CANDIDACY EXAMINATION

In order to be admitted to candidacy, the student must pass a candidacy exam, which is designed to evaluate the student's overall ability to engage in high-level research. The candidacy exam consists of a written qualifying examination and dissertation proposal defense. The proposal must be approved by the student's AEC at least one semester prior to/ the final oral examination. The written qualifying exam includes material from the eight areas of specialization.

A student who has successfully completed all coursework, passed the qualifying examination, and successfully defended the research proposal is defined as one who is a candidate for the Ph.D. degree.

## FINAL EXAMINATION

At the completion of the dissertation research, candidates must prepare a dissertation and pass the final oral examination (defense) administered by their AEC.

In order to complete the Ph.D. requirements, a student must pass a final oral examination on the results embodied in the dissertation. This examination is open to the public and, in order to evaluate critically the student's competency, may include testing on material in related fields, as deemed necessary by the AEC. In addition, since the Ph.D. degree is primarily a research degree that embodies the results of an original research proposal and represents a significant contribution to scientific literature, the student must submit a manuscript on this research to the AEC.

## Suggested Plan of Study

It is important for students to take courses in the order specified as much as possible; all prerequisites and concurrent requirements must be observed. A typical doctoral degree program that completes degree requirements in four years is as follows.

### First Year

Fall	Hours Spring	Hours
Course	3 Course	3
Course	3 Course	3
MINE 797	3 MINE 797	3
	9	9

### Second Year

Fall	Hours Spring	Hours
Course	3 Course	3
MINE 797	6 MINE 797	6
	9	9

### Third Year

Fall	Hours Spring	Hours
MINE 797	9 MINE 797	9
	9	9

### Fourth Year

Fall	Hours Spring	Hours
MINE 797	9 MINE 797	9
	9	9

Total credit hours: 72

## Major Learning Goals

### MASTER OF SCIENCE IN MINING ENGINEERING (MSMINE)

Upon graduation, with a Masters of Science degree in Mining Engineering, students will have:

- Ability to investigate and develop solutions to advanced mining engineering problems
- Advanced technical knowledge and research experience needed to address the most challenging contemporary issues within a specialized area of study

### DOCTOR OF PHILOSOPHY (PHD)

Upon graduation with a Ph.D. degree from the Statler College of Engineering and Mineral Resources, students will have:

- Ability to initiate research ideas in order to solve specific problems and to write research proposals on these ideas
- Have an expert-level understanding of the advanced principles of their fields of study
- Furthered a novel research idea which has contributed to the state of the art in their specific areas of expertise
- Ability to plan original research projects, to perform laboratory or field based experimental tasks, generate data from those tasks, and draw conclusions based on sound scientific and engineering principles
- Ability to develop innovative research in order to advance the frontiers of knowledge and secure sponsored research
- Ability to write technical articles for dissemination through peer-reviewed, refereed journals or other venues
- Ability to make oral and poster presentations at technical meetings

- Understanding of professional and ethical responsibilities in the practice of their profession to contribute to the well-being of society and to the advancement of their profession
- Demonstrated initiative in research planning and management, including safety and environmental issues
- Technical preparation for and an awareness of the need for life-long learning and continuing education