

# Department of Mining Engineering

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## Degree Offered

- Bachelor of Science in Mining Engineering (B.S.Min.E.)
- Dual Major in Mining and Civil Engineering

## Nature of the Program

Mining engineering deals with discovering, extracting, processing, marketing, and utilizing mineral deposits from the earth's crust. The role of the mining engineer may be quite diversified, and the field offers opportunities for specialization in a large number of technical areas. The trained professional in this field is well versed in mining and geology and also in the principles of civil, electrical, and mechanical engineering as applied to the mining industry. With the present trend toward the use of engineers in industrial management and administrative positions, the mining engineer's training also includes economics, business, personnel management, and the humanities.

The mission of the Bachelor of Science in Mining Engineering (B.S.Min.E.) program at West Virginia University has been established to produce graduates who are thoroughly prepared to meet the operational and engineering challenges of the mining industry and to continue their studies in graduate programs. The Bachelor of Science degree in Mining Engineering is accredited by the Engineering Accreditation Commission of ABET, <http://www.abet.org>, under the General Criteria and the Program Criteria for Mining Engineering.

Professional technical courses include surface and underground mining systems, engineering principles of blasting, materials handling, ventilation, roof control, rock mechanics, mining equipment, coal and mineral preparation, plant and mine design, geology, and water control. In addition, students receive a foundation in the managerial, financial, environmental, and social aspects of the operation of a mining enterprise. Local coal fields, mines, and preparation plants provide extensive opportunity for research, instruction, and field work in a real-world situation.

In the fourth year, the student may specialize in such career areas as coal mining, ore mining, or other phases of mining engineering through the proper selection of design problems and electives. The student will be assigned an advisor who will assist in this phase of the program.

## Program Educational Objectives

The four program educational objectives of the WVU BSMine have been established:

1. Our graduates will be successful in their professional careers and will continue to develop professionally and serve in leadership roles in industry, research, public service, and/or post-graduate education.
2. Our graduates will achieve their professional objectives by coordinating and leveraging key aspects of Mining Engineering: geology, exploration, valuation, development, exploitation, reclamation, and beneficiation.
3. Our graduates will successfully utilize engineering principles and technology to solve engineering problems in their career.
4. Throughout their careers, our graduates will successfully demonstrate their awareness and appreciation for professional registration, ethics, and lifelong learning while recognizing their obligations to society, the environment, the profession, and miner health and safety.

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## FACULTY

### CHAIR

- Qingqing Huang - Ph.D. (University of Kentucky)  
Mineral processing, Coal preparation, Explosion mitigation, Extractive metallurgy

### ASSISTANT PROFESSOR

- Qingqing Huang - Ph.D. (University of Kentucky)  
Mineral processing, Coal preparation, Explosion mitigation, Extractive metallurgy
- Deniz Talan - Ph.D. (West Virginia University)  
Critical mineral recovery from secondary sources, environmental assessment, and general mineral processing topics
- I. Berk Tulu - Ph.D. (West Virginia University)  
Coal/stone/hard rock pillar stability, Coal bump/burst, Rock drilling and fragmentation
- Deniz Tuncay - Ph.D. (West Virginia University)  
Ground control, rock mechanics, and geomechanics

### LECTURER

- Dan Alexander - Ph.D. (West Virginia University)  
Mineral economics evaluation

## Degree Requirements

Students must meet the following criteria to qualify for a Bachelor of Science in Mining Engineering degree:

- Complete a minimum of 134 credit hours
- Satisfy WVU's undergraduate degree requirements
- Satisfy Statler College's undergraduate degree requirements (<http://catalog.wvu.edu/undergraduate/collegeofengineeringandmineralresources/#policies> text)
- Complete all courses listed in the curriculum requirements with the required minimum grades
- Attain an overall grade point average of 2.00 or better
- Attain a WVU grade point average of 2.00 or better
- Attain a Statler grade point average of 2.00 or better
- A maximum of one math or science courses with a grade of D+, D, or D- may apply towards a Statler College degree
- Complete a survey regarding their academic and professional experiences at WVU, as well as post-graduation job placement or continuing education plans.

The Statler GPA is computed based on all work taken at WVU with a subject code within Statler College (BIOM, BMEG, CE, CHE, CPE, CS, CSEE, CYBE, EE, ENGR, ENVE, ETEC, IENG, IH&S, MAE, MINE, PDA, PNGE, SAFM, SENG) excluding ENGR 140, ENGR 150, and CS 101. The WVU GPA is computed based on all work taken at WVU. The Overall GPA is computed based on all work taken at WVU and transfer work.

## Curriculum Requirements

Code	Title	Hours
University Requirements		19
Fundamentals of Engineering Requirements		5
Math and Science Requirements		38
Mining Engineering Program Requirements		72
Total Hours		134

## University Requirements

Code	Title	Hours
General Education Foundations (GEF) 1, 2, 3, 4, 5, 6, 7, and 8 (31-37 Credits)		
Outstanding GEF Requirements 1, 4, 5, 6, and 7		18
ENGR 191	First-Year Seminar	1
Total Hours		19

## Fundamentals of Engineering Requirements

Code	Title	Hours
A minimum grade of C- is required in all Fundamentals of Engineering courses.		
ENGR 101	Engineering Problem Solving 1	2
Engineering Problem Solving (Select one of the following):		3
CHE 102	Introduction to Chemical Engineering	
ENGR 102	Engineering Problem Solving 2	
ENGR 103	Introduction to Nanotechnology Design	
MAE 102	Introduction to Mechanical and Aerospace Engineering Design	
Total Hours		5

## Math and Science Requirements

Code	Title	Hours
A minimum grade of C- is required in all Math and Science courses.		
CHEM 115 & 115L	Fundamentals of Chemistry 1 and Fundamentals of Chemistry 1 Laboratory (GEF 2B)	4
MATH 155	Calculus 1 (GEF 3)	4
MATH 156	Calculus 2 (GEF 8)	4
MATH 251	Multivariable Calculus	4

MATH 261	Elementary Differential Equations	4
PHYS 111 & 111L	General Physics 1 and General Physics 1 Laboratory (GEF 8)	4
PHYS 112 & 112L	General Physics 2 and General Physics 2 Laboratory (GEF 8)	4
STAT 215	Introduction to Probability and Statistics	3
SUST 101 & 101L	Sustainable Earth and Sustainable Earth Laboratory	4
GEOL 342	Structural Geology for Engineers	3
Total Hours		38

## Mining Engineering Program Requirements

Code	Title	Hours
ESWS 455	Reclamation of Disturbed Soils	3
MAE 241	Statics	3
MAE 242	Dynamics	3
MAE 243	Mechanics of Materials	3
MAE 320	Thermodynamics	3
MAE 331	Fluid Mechanics	3
MINE 201 & 201L	Mine Surveying and Mine Surveying Laboratory	3
MINE 205	Underground Mining Systems	3
MINE 206	Surface Mining Systems	4
MINE 261	Engineering CAD	2
MINE 306	Mineral Property Evaluation	3
MINE 331	Mine Ventilation	3
MINE 382	Mine Power Systems	3
MINE 411 & 411L	Rock Mechanics/Ground Control and Rock Mechanics/Ground Control Laboratory	4
MINE 427 & 427L	Coal Preparation and Coal Preparation Laboratory	4
or MINE 425 & 425L	Mineral Processing and Mineral Processing Laboratory	
MINE 461	Applied Mineral Computer Methods	3
MINE 471	Mine and Safety Management	3
MINE 483S	Mine Design-Exploration Mapping	3
MINE 484	Mine Design-Report Capstone (Fulfills Writing and Communications Skills Requirement)	4
Mining Technical Electives (300 or 400 level MINE course)		6
Engineering/Science Electives: 300 or 400 level science or engineering course in BIOM, BMEG, CE, CHE, CPE, CS, EE, ENVE, IENG, MAE, MINE, PNGE, BIOL, CHEM, PHYS, GEOL, and MATH.		6
Total Hours		72

## 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 B.S.Min.E. degree program that completes degree requirements in four years is as follows:

### First Year

Fall	Hours	Spring	Hours
MATH 155 (GEF 3)		4 MATH 156 (GEF 8)	4
ENGR 101		2 ENGR 102	3
ENGR 191		1 PHYS 111 & 111L (GEF 8)	4
CHEM 115 & 115L (GEF 2)		4 GEF 4	3

ENGL 101 (GEF 1)		3 GEF 5	3
GEOL 101		3	
GEOL 101L		1	
		18	17
<b>Second Year</b>			
<b>Fall</b>	<b>Hours</b>	<b>Spring</b>	<b>Hours</b>
MINE 205		3 MINE 206	4
MINE 201 & 201L		3 MAE 243	3
MINE 261		2 MATH 261	4
MAE 241		3 PHYS 112 & 112L (GEF 8)	4
GEOL 342		3 MAE 331	3
MATH 251		4	
		18	18
<b>Third Year</b>			
<b>Fall</b>	<b>Hours</b>	<b>Spring</b>	<b>Hours</b>
MINE 306		3 MINE 331	3
MINE 382		3 ENGL 102 (GEF 1)	3
MINE 461		3 MAE 242	3
MAE 320		3 GEF 6	3
STAT 215		3 Select one of the following:	4
		MINE 425 & 425L	
		MINE 427 & 427L	
		15	16
<b>Fourth Year</b>			
<b>Fall</b>	<b>Hours</b>	<b>Spring</b>	<b>Hours</b>
MINE 411 & 411L		4 MINE 484	4
MINE 483S		3 ESWS 455	3
MINE 471		3 Two Engineering/Science Electives	6
Mining Technical Elective		3 Mining Technical Elective	3
GEF 7		3	
		16	16

Total credit hours: 134

## Degree Requirements

Students must meet the following criteria to qualify for a Bachelor of Science in Mining Engineering and Bachelor of Science in Civil Engineering:

- Complete a minimum of 151 credit hours
- Satisfy WVU's undergraduate degree requirements
- Satisfy Statler College's undergraduate degree requirements (<http://catalog.wvu.edu/undergraduate/collegeofengineeringandmineralresources/#policiestext>)
- Complete all courses listed in the curriculum requirements with the required minimum grades
- Attain an overall grade point average of 2.00 or better
- Attain a WVU grade point average of 2.00 or better
- Attain a Statler grade point average of 2.00 or better
- A maximum of one math or science course with a grade of D+, D, or D- may apply toward a Statler College degree
- Complete a survey regarding their academic and professional experiences at WVU, as well as post-graduation job placement or continuing education plans

The Statler GPA is computed based on all work taken at WVU with a subject code within Statler College (BIOM, BMGE, CE, CHE, CPE, CS, CSEE, CYBE, EE, ENGR, ENVE, ETEC, IENG, IH&S, MAE, MINE, PDA, PNGE, SAFM, SENG) excluding ENGR 140, ENGR 150, and CS 101. The WVU GPA is computed based on all work taken at West Virginia University. The Overall GPA is computed based on all work taken at West Virginia University and transfer work.

## Curriculum Requirements

Code	Title	Hours
University Requirements		16
Fundamentals of Engineering Requirements		5
Math and Science Requirements		38
Mining Engineering and Civil Engineering Program Requirements		92
Total Hours		151

## University Requirements

Code	Title	Hours
General Education Foundations (GEF) 1, 2, 3, 4, 5, 6, 7, and 8 (31-37 Credits)		
Outstanding GEF Requirements 1, 5, 6, 7		15
ENGR 191	First-Year Seminar	1
Total Hours		16

## Fundamentals of Engineering Requirements

Code	Title	Hours
A minimum grade of C- is required in all Fundamentals of Engineering courses.		
ENGR 101	Engineering Problem Solving 1	2
Engineering Problem Solving (Select one of the following):		3
CHE 102	Introduction to Chemical Engineering	
ENGR 102	Engineering Problem Solving 2	
ENGR 103	Introduction to Nanotechnology Design	
MAE 102	Introduction to Mechanical and Aerospace Engineering Design	
Total Hours		5

## Math and Science Requirements

Code	Title	Hours
A minimum grade of C- is required in all Math and Science courses. *		
MATH 155	Calculus 1 (GEF 3)	4
MATH 156	Calculus 2 (GEF 8)	4
MATH 251	Multivariable Calculus	4
MATH 261	Elementary Differential Equations	4
CHEM 115 & 115L	Fundamentals of Chemistry 1 and Fundamentals of Chemistry 1 Laboratory (GEF 2B)	4
PHYS 111 & 111L	General Physics 1 and General Physics 1 Laboratory (GEF 8)	4
PHYS 112 & 112L	General Physics 2 and General Physics 2 Laboratory	4
STAT 215	Introduction to Probability and Statistics	3
SUST 101 & 101L	Sustainable Earth and Sustainable Earth Laboratory	4
GEOL 342	Structural Geology for Engineers	3
Total Hours		38

## Mining Engineering and Civil Engineering Program Requirements

Code	Title	Hours
CE 201	Introduction to Civil Engineering	1
CE 301	Engineering Professional Development	1
CE 321	Fluid Mechanics for Civil Engineers	3
CE 332	Introduction to Transportation Engineering	3
CE 347 & 347L	Introduction to Environmental Engineering and Introduction to Environmental Engineering Laboratory	4
CE 351 & 351L	Introductory Soil Mechanics and Introductory Soil Mechanics Laboratory	4
CE 361 & 361L	Structural Analysis 1 and Structural Analysis 1 Laboratory	4
CE 479	Integrated Civil Engineering Design-Capstone	3
ECON 201	Principles of Microeconomics (GEF 4)	3
IENG 377	Engineering Economy	3
MAE 241	Statics (minimum grade of C-)	3
MAE 242	Dynamics	3
MAE 243	Mechanics of Materials (minimum grade of C-)	3
MAE 320	Thermodynamics	3
MINE 201 & 201L	Mine Surveying and Mine Surveying Laboratory	3
MINE 205	Underground Mining Systems	3
MINE 206	Surface Mining Systems	4
MINE 261	Engineering CAD	2
MINE 306	Mineral Property Evaluation	3
MINE 331	Mine Ventilation	3
MINE 382	Mine Power Systems	3
MINE 411 & MAE 411L	Rock Mechanics/Ground Control and Advanced Mechatronics Laboratory	4
MINE 425 & 425L or MINE 427 & 427L	Mineral Processing and Mineral Processing Laboratory Coal Preparation and Coal Preparation Laboratory	4
MINE 471	Mine and Safety Management	3
MINE 483S	Mine Design-Exploration Mapping	3
MINE 484	Mine Design-Report Capstone	4
CE Design Electives <sup>+</sup>		6
CE Open Electives <sup>+</sup>		6
Total Hours		92

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See BSCE degree (<http://catalog.wvu.edu/undergraduate/collegeofengineeringandmineralresources/departments/civilandenvironmental/#majortext>) for list of electives

## 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 dual B.S.Min.E. and B.S.C.E. degree program that completes degree requirements in five years is as follows:

### First Year

Fall	Hours	Spring	Hours
MATH 155 (GEF 3)		4 MATH 156 (GEF 8)	4
ENGR 101		2 ENGR 102	3
ENGR 191		1 PHYS 111 & 111L (GEF 8)	4

CHEM 115 & 115L (GEF 2)		4 SUST 101 & 101L	4
ENGL 101 (GEF 1)		3 GEF 6	3
GEF 5		3	
		17	18
<b>Second Year</b>			
<b>Fall</b>	<b>Hours</b>	<b>Spring</b>	<b>Hours</b>
CE 201		1 ENGL 102	3
MAE 241		3 MAE 242	3
MATH 251		4 MATH 261	4
MINE 201 & 201L		3 MINE 206	4
MINE 205		3 PHYS 112 & 112L	4
MINE 261		2	
		16	18
<b>Third Year</b>			
<b>Fall</b>	<b>Hours</b>	<b>Spring</b>	<b>Hours</b>
CE 321		3 CE 332	3
GEO 342		3 CE 351 & 351L	4
MAE 243		3 MINE 331	3
MAE 320		3 MINE 427 & 427L	4
STAT 215		3	
		15	14
<b>Fourth Year</b>			
<b>Fall</b>	<b>Hours</b>	<b>Spring</b>	<b>Hours</b>
CE 347 & 347L		4 CE 301	1
CE 361 & 361L		4 CE Design Elective	3
MINE 306		3 CE Design Elective	3
MINE 382		3 IENG 377	3
		CE Open Elective	3
		14	13
<b>Fifth Year</b>			
<b>Fall</b>	<b>Hours</b>	<b>Spring</b>	<b>Hours</b>
ECON 201		3 CE Open Elective	3
MINE 411 & 411L		4 CE 479	3
MINE 471		3 MINE 484	4
MINE 483S		3 GEF 7	3
		13	13

Total credit hours: 151

## Major Learning Outcomes

### MINING ENGINEERING

Upon graduation, all Bachelor of Science students in Mining Engineering will:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors

3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.