

### Third Year

First Semester	Hrs.
MAE 244 <i>Dynam. &amp; Strength Lab.</i> .....	1
MAE 320 <i>Thermodynamics</i> .....	3
MAE 335 <i>Incompressible Aerodyn.</i> ...	3
MAE 343 <i>Intermed. Mech of Matls.</i> ...	3
EE 221 <i>Basic Electrical Engr.</i> .....	3
EE 222 <i>Basic Electrical Lab.</i> .....	1
GEC Elective .....	3
<b>Total</b> .....	<b>17</b>

Second Semester	Hrs.
MAE 316 <i>Analy. of Eng. Sys.</i> .....	3
MAE 336 <i>Compressible Aero.</i> .....	3
MAE 342 <i>Dynamics of Machines</i> .....	3
MAE 345 <i>Aerospace Structures</i> .....	3
MAE 365 <i>Flight Dynamics</i> .....	3
GEC Elective .....	3
<b>Total</b> .....	<b>18</b>

### Fourth Year

First Semester	Hrs.
MAE 322 <i>Thermal &amp; Fluids Lab</i> .....	1
MAE 426 <i>Flight Vehicle Propulsion</i> ...	3
MAE 434 <i>Experimental Aerodyn</i> .....	2
MAE 456 <i>CAD/Finite Elem Anal.</i> .....	3
MAE 475 <i>Flight Vehicle Design</i> .....	3
Technical Elective.....	3
Technical Elective.....	3
<b>Total</b> .....	<b>18</b>

Second Semester	Hrs.
MAE 411 <i>Advanced Mechatronics</i> ....	3
MAE 423 <i>Heat Transfer</i> .....	3
MAE 460 <i>Automatic Controls</i> .....	3
MAE 476 <i>Space Flight and Sys.</i> .....	3
IENG 302 <i>Mfg. Process</i> .....	2
IENG 303 <i>Mfg. Process Lab</i> .....	1
Technical Elective .....	3
<b>Total</b> .....	<b>18</b>

### Fifth Year

First Semester	Hrs.
MAE 454 <i>Machine Design &amp; Mfg.</i> .....	3
MAE 471 <i>Prin. of Engr. Design</i> .....	3
Technical Elective.....	3
Technical Elective.....	2
GEC Elective .....	3
<b>Total</b> .....	<b>14</b>
<b>Grand Total</b> .....	<b>155</b>

**Note:** Six hours of technical electives must be selected from a list of approved aerospace engineering technical electives and other six hours from a list of approved mechanical engineering technical electives after consulting with the advisor; the courses selected should form a clear and consistent pattern according to the career objectives of the student. The 12 hours of General Education Curriculum (GEC) courses must be selected to meet the University and college GEC requirements

## Department of Mining Engineering

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### Degree Offered

*Bachelor of Science in Mining Engineering*

### Curriculum in Mining Engineering

Mining engineering deals with discovering, extracting, beneficiating, 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 educational objectives of the B.S.Min.E. program have 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. Graduates will meet the following objectives:

- Graduates are well prepared in application of mathematics, science, and engineering.
- Graduates are well prepared to design and conduct experiments, as well as to analyze and interpret data.
- Graduates are well prepared to design a system, component, or process to meet desired needs.
- Graduates have an ability to function on multidisciplinary teams.
- Graduates have an ability to identify, formulate, and solve engineering problems.
- Graduates have an understanding of professional and ethical responsibility.
- Graduates have an ability to communicate effectively.
- Graduates have the broad education necessary to understand the impact of engineering solutions in a global and societal context.
- Graduates have a recognition of the need for, and an ability to engage in life-long learning.
- Graduates have knowledge of contemporary issues.
- Graduates have an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
- Graduates have an understanding of the importance of economics, environmental, health, and safety issues in the operations of modern mines.
- Graduates have an ability to learn independently.

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.

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.

Local coal fields, mines, and preparation plants provide extensive opportunity for research, instruction, and field work in a real-world situation

## **Mining Engineering (B.S.M.E.)**

### *First Year*

Common first year as listed on the *middle* of page 102.

### *Second Year*

First Semester	Hrs.	Second Semester	Hrs.
MINE 205 <i>Undergrd. Mining Syst.</i> .....	3	MINE 206 <i>Surf. Mining Systems</i> .....	4
MINE 201 <i>Mine Surveying</i> .....	3	MAE 242 <i>Dynamics</i> .....	3
MINE 261 <i>Engineering CAD</i> .....	2	MATH 261 <i>Elem. Differential Equat.</i> ..	4
MAE 241 <i>Statics</i> .....	3	PHYS 112 <i>General Physics</i> .....	4
GEOL 342 <i>Struct. Geol. for Engr.</i> .....	3	MAE 331 <i>Fluid Mechanics</i> .....	3
MATH 251 <i>Multivariable Calculus</i> ....	4	<b>Total</b> .....	<b>18</b>
<b>Total</b> .....	<b>18</b>		

### *Third year*

First semester	Hrs.	Second semester	Hrs.
MINE 306 <i>Mining Expl. and Eval.</i> .....	3	MINE 331 <i>Mine Ventilation</i> .....	3
MINE 382 <i>Mine Power System</i> .....	3	MINE 427 <i>Coal Preparation</i> .....	4
Mine 461 <i>Appl. Min. Comp. Meth.</i> .....	3	ENGL 102 <i>Composition &amp; Rhetoric</i> ..	3
MAE 320 <i>Thermodynamics</i> .....	3	MAE 243 <i>Mech. of Materials</i> .....	3
GEC Elective.....	3	GEC Elective.....	3
<b>Total</b> .....	<b>15</b>	<b>Total</b> .....	<b>16</b>

#### Fourth year

First semester	Hrs.
MINE 411 <i>Rock Mechanics</i> .....	4
MINE 483 <i>Mine Design-mapping</i> .....	2
MINE 471 <i>Mine &amp; Safety Mgmt.</i> .....	3
Technical Elective* .....	3
GEC Elective .....	3
<b>Total</b> .....	<b>15</b>
<b>Grand Total</b> .....	<b>134</b>

Second semester	Hrs.
MINE 484 <i>Mine Design-Report</i> .....	4
AGRN 455 <i>Recl. of Disturbed Soils</i> ...3	
Mine 480 <i>Multidis. Team Project</i> .....	1
Eng/Sci Technical Elective** .....	3
GEC Elective .....	6
<b>Total</b> .....	<b>17</b>

\* Technical elective options are MINE 407, MINE 414, or other courses from mining engineering approved by the department.

\*\* Eng/Sci technical elective may be selected from non-mining engineering/science courses, or mining engineering courses approved by the department.

For the most recent list of approved courses in the General Education Curriculum, visit the GEC Web site at WVU Admissions and Records.

### Curriculum for a Dual Major in Mining and Civil Engineering

Students can simultaneously pursue B.S. degrees in mining engineering and civil engineering by completing additional courses. The dual degree program requires satisfactory completion of 158 credit hours. A suggested schedule for the dual curriculum in mining engineering and civil engineering is shown below.

#### Mining Engineering/Civil Engineering (Dual)

##### First Year

Common first year as listed on the *middle* of page 102.

##### Second Year

Fall Semester	Hrs.
CE 201 <i>Introduction to CE</i> .....	1
MAE 241 <i>Statics</i> .....	3
MATH 251 <i>Multivariate Calculus</i> .....	4
MINE 201 <i>Mine Surveying</i> .....	3
MINE 205 <i>Undgrd. Mining Sys</i> .....	3
MINE 261 <i>Engineering CAD</i> .....	2
<b>Total</b> .....	<b>16</b>

Spring Semester	Hrs.
ENGL 102 <i>Composition &amp; Rhetoric</i> ...3	
MAE 242 <i>Dynamics</i> .....	3
MATH 261 <i>Elem. Differential Equat</i> ...4	
MINE 206 <i>Surface Mining Systems</i> ...4	
PHYS 112 <i>General Physics</i> .....	4
<b>Total</b> .....	<b>18</b>

##### Third Year

Fall Semester	Hrs.
CE 321 <i>Fluid Mechanics</i> .....	3
GEOG 342 <i>Structural Geology</i> .....	3
MAE 243 <i>Mechanics of Materials</i> .....	3
MAE 320 <i>Thermodynamics</i> .....	3
STAT 215 <i>Statistics</i> .....	3
<b>Total</b> .....	<b>15</b>

Spring Semester	Hrs.
CE Core <sup>†</sup> .....	4
CE Core <sup>†</sup> .....	4
MINE 331 <i>Mine Ventilation</i> .....	3
MINE 427 <i>Coal Preparation</i> .....	4
MINE 480 <i>Interdis. Team Project</i> .....	1
<b>Total</b> .....	<b>16</b>

##### Fourth Year

Fall Semester	Hrs.
CE Core <sup>†</sup> .....	4
CE Core <sup>†</sup> .....	4
MINE 306 <i>Mining Explor. &amp; Eval.</i> .....	3
MINE 382 <i>Mine Power System</i> .....	3
<b>Total</b> .....	<b>14</b>

Spring Semester	Hrs.
CE <i>Seminar</i> .....	1
CE <i>Design Elective*</i> .....	3
CE <i>Design Elective*</i> .....	3
CE 322 <i>Hydrotechnical Engr.</i> .....	3
GEC Elective .....	3
IENG 377 <i>Engineering Economy</i> .....	3
<b>Total</b> .....	<b>16</b>

### Fifth Year

Fall Semester	Hrs.
GEC Elective .....	3
GEC: ECON 201 <i>Prin. of Microecon.</i>	3
MINE 411 <i>Rock Mech. &amp; Grnd Cont.</i>	4
MINE 471 <i>Mine and Safety Mgmt.</i>	3
MINE 483 <i>Mine Design-Explor.</i>	2
<b>Total</b> .....	<b>15</b>

Spring Semester	Hrs.
CE <i>Technical Elective**</i> .....	3
CE 479 <i>Integrated Design</i> .....	3
GEC Elective .....	3
GEC Elective .....	3
MINE 484 <i>Mine Design-Report (W)</i> ..	4
<b>Total</b> .....	<b>16</b>

### Total Credit Hours for the BS CE & MINE Double Major Program: 158

#### Notes:

1. Discipline substitutions are:

l. MINE 306 fulfills requirement of CE Engr/Math/Sci Elective 1.

m. MINE 411 fulfills requirement of CE Engr/Math/Sci Elective 2.

n. MINE requirement for AGRN 455 is fulfilled through CE 322 and CE 351.

o. MINE 382 fulfills requirement of CE engineering elective outside CE.

p. MINE 461 is fulfilled by CE 322.

q. MINE 484W fulfills CE requirement of ENGL 305.

r. MINE requirement for STAT 211 is fulfilled by CE requirement of STAT 215.

s. CE 321 fulfills MINE requirement for MAE 331.

t. MINE technical elective and MINE Eng/Sci technical elective requirements are fulfilled by any two of the following; CE 332, 347, or 361.

u. GEOL 342 fulfills requirement of CE basic science elective.

v. MINE 261 substitutes for CE 210.

2. \*CE core classes are: CE 332 *Introduction to Transportation Engineering*; CE 351 *Introductory Soil Mechanics*; CE 347 *Environmental Engineering*; CE 361 *Structural Analysis I*.

\* CE design electives may be selected from civil engineering design courses approved by the CE department. See your advisor for a list of acceptable courses in CE Department.

\*\* CE technical electives may be selected from civil engineering courses approved by the CE department. See your advisor for a list of acceptable courses in CE department.

3. For the most recent list of approved courses in the GEC program, visit the GEC Web site at WVU Admissions and Records.

### Dual Degree Curriculum for Mining Engineering and Geology

This curriculum allows students to simultaneously pursue B.S. degrees in both mining engineering and geology. The dual degree program requires satisfactory completion of 158 credits, and meets all the requirements for both degrees. A suggested schedule for the dual degree curriculum in mining engineering and geology is shown below.

### Mining Engineering/Geology (Dual)

#### First Year

Common first year as listed on the *middle* of page 102.

#### Second Year

Fall Semester	Hrs.
GEOL 284 <i>Mineralogy</i> .....	3
MAE 241 <i>Statics</i> .....	3
MATH 251 <i>Multivariate Calculus</i> .....	4
MINE 201 <i>Mine Surveying</i> .....	3
MINE 205 <i>Undergrd. Mining Syst</i> .....	3
MINE 261 <i>Engineering CAD</i> .....	2
<b>Total</b> .....	<b>18</b>

Spring Semester	Hrs.
CHEM 116 <i>Fndmnts. of Chemistry</i> .....	4
GEOL 285 <i>Introductory Petrology</i> .....	3
MAE 331 <i>Fluid Mechanics</i> .....	3
MINE 206 <i>Surface Mining Systems</i> .....	4
PHYS 112 <i>General Physics</i> .....	4
<b>Total</b> .....	<b>18</b>

#### Third Year

Fall Semester	Hrs
GEOL 341 <i>Structural Geology</i> .....	3
MAE 320 <i>Thermodynamics</i> .....	3
MATH 261 <i>Elem. Differential Equat.</i> ..	4
MINE 461 <i>App Minrl Comp. Mthds</i> ..	3
STAT 211 <i>Elem. Statistical Inference</i> ..	3
<b>Total</b> .....	<b>16</b>

Spring Semester	Hrs
GEC Elective .....	3
GEOL 311 <i>Stratigraphy and Sedimentation (W)</i> .....	3
MAE 331 <i>Mechanics of Materials</i> .....	3
MINE 331 <i>Mine Ventilation</i> .....	3
MINE 427 <i>Coal Preparation</i> .....	4
MINE 480 <i>Interdis. Team Project</i> .....	1
<b>Total Hrs.</b> .....	<b>17</b>

Summer	Hrs.
GEOL 404 <i>Geology Field Camp</i> **	6
<b>Total Hrs</b>	<b>6</b>

*Fourth Year*

Fall Semester	Hrs
GEC Elective	3
GEC Elective (ECON 201 <i>Principle of Microeconomics</i> )	3
GEOL 331 <i>Paleontology, or</i> <i>GEOL 454 Environmental and</i> <i>Exploration Geophysics</i>	3
MINE 382 <i>Mine Power System</i>	3
MINE 306 <i>Mine Explor. &amp; Eval.</i>	3
<b>Total</b>	<b>15</b>

Spring Semester	Hrs
GEC Elective	3
GEC Elective	3
GEOL 321 <i>Geomorphology</i>	3
GEOL Elective*	3
MAE 242 <i>Dynamics</i>	3
GEOL Elective*	3
MAE 242 <i>Dynamics</i>	3
MINE 483 <i>Mine Design-Exploration</i>	2
<b>Total</b>	<b>23</b>

*Fifth Year*

Fall Semester	Hrs.
GEC Elective	3
GEOL 495 or MINE 495 <i>Independent Study</i> **	1
MINE 411 <i>Rock Mechanics &amp;</i> <i>Ground Control</i>	4
MINE 471 <i>Mine and Safety Mgmt.</i>	3
MINE 484 <i>Mine Design-Report (W)</i>	4
<b>Total</b>	<b>15</b>

**Total Credit Hours for the Geology and Mining Engineering Dual Major: 158**

**Notes:**

1. Discipline substitutions are:
  - w. GEOL 311 and other GEOL Upper-division elective course fulfill the requirements for MinE technical elective and Eng/Sci technical elective.
  - x. GEOL requirement for GEOL 341 is substituted for MINE requirement for GEOL 342.
  - y. MinE requirement of ARGN 455 is fulfilled through GEOL 321
  - z. MinE 205 and MinE 206 fulfill the requirement of GEOL upper-division technical electives.
  - aa. MinE 484W and GEOL 311W fulfill the requirement of writing course.
  - bb. Econ 201 and GEOL 101 fulfill two of the GEC requirements in the mining curriculum.
2. \*GEOL technical elective may be any GEOL upper-division elective courses including GEOL 493, but not GEOL 351.
 

\*\* One credit hour from GEOL 495, MINE 495, or Eng/Sci technical electives or others approved by GEOL or MINE Department can be used to satisfy 158 total credit hours requirement.

\*\*\* GEOL 404 *Summer Field Camp* is GEOL capstone course.
3. For the most recent list of approved courses in the GEC program, visit the GEC Web site at WVU Admissions and Records.