

College of Engineering  
Department of Mining and Minerals Engineering  
Degree: Bachelor of Science in Mining Engineering  
Major: Mining Engineering

For students graduating in calendar year 2022 *and* for student date of entry under UG Catalog 2020-2021

Credits Required for Graduation: 127

FALL SEMESTER FIRST YEAR		Credits	SPRING SEMESTER FIRST YEAR		Credits
CHEM 1035 General Chemistry		3	ENGL 1106 First-Year Writing <i>Pre: ENGL 1105</i>		3
CHEM 1045 General Chemistry Lab <i>Co: CHEM 1035</i>		1	MATH 1226 Calculus of a Single Variable <i>Pre: MATH 1225</i>		4
ENGL 1105 First-Year Writing		3	MATH 1114 Elementary Linear Algebra —OR— MATH 2114 Introduction to Linear Algebra <i>Pre: 1225 or 1226</i>		2-3
MATH 1225 Calculus of a Single Variable (C-) <i>Pre: Math Ready</i>		4	PHYS 2305 Foundations of Physics <i>Pre(MATH 1205 or MATH 1205H or MATH 1225 or MATH 1206 or MATH 1206H or MATH 1226)</i>		4
ENGE 1215 Foundations of Engineering (C-)		2	ENGE 1216 Foundations of Engineering (C-) <i>Pre: ENGE 1215</i>		2
Pathways Concept 2		3	Pathways Concept 2		3
<b>TOTAL</b>		<b>16</b>	<b>TOTAL</b>		<b>18-19</b>
FALL SEMESTER SECOND YEAR		Credits	SPRING SEMESTER SECOND YEAR		Credits
GEOS 1004 Introduction to Earth Science		3	ESM 2204 Mechanics of Deformable Bodies <i>Pre: (2104 or 2114), (MATH 2224 or MATH 2224H or MATH 2204 or MATH 2204H)</i>		3
GEOS 1104 Intro to Earth Sciences Lab		1	ESM 2304 Dynamics <i>Pre: (2104 or 2114), (MATH 2224 or MATH 2224H or MATH 2204 or MATH 2204H)</i>		3
MATH 2204 Intro to Multivariable Calculus <i>Pre: MATH 1226</i>		3	MATH 2214 Introduction to Differential Equations <i>Pre: (MATH 1114 or MATH 2114 or MATH 2114H or 2405H), 1226</i>		3
ESM 2104 Statics <i>Pre: MATH 1226. Co: MATH 2204 or MATH 2204H or MATH 2224 or MATH 2406H</i>		3	MINE 2544 Leadership for Responsible Mining <i>Pre: 2504, ENGL 1106</i>		2 <sup>[S]</sup>
MINE 2504 Intro to Mining Engineering <sup>1</sup>		3 <sup>[F]</sup>	MINE 2564 Resource Exploration and Design <sup>1</sup> <i>Pre: 2504, GEOS 1004</i>		3 <sup>[S]</sup>
MINE 2534 Mine Surveying and Mapping <i>Pre: (ENGE 1104 or ENGE 1114), (MATH 1224 or MATH 2204 or MATH 2204H)</i>		3 <sup>[F]</sup>	Pathways Concept 3/7		3
<b>TOTAL</b>		<b>16</b>	<b>TOTAL</b>		<b>17</b>
FALL SEMESTER THIRD YEAR		Credits	SPRING SEMESTER THIRD YEAR		Credits
MINE 3604 Mining Geomechanics <sup>1</sup> <i>Pre: 2504, ESM 2204, GEOS 1004</i>		3 <sup>[F]</sup>	GEOS 3104 Elementary Geophysics <i>Pre: (1004 or 2024 or 2104), (MATH 1026 or MATH 1226), (PHYS 2205 or PHYS 2305)—OR— GEOS 3404 Elements of Structural Geology <i>Pre: (1004 or 2024 or 2104)—OR— GEOS 4824 Engineering Geology <i>Pre: (1004 or 2024 or 2104), (PHYS 2305 or PHYS 2205), (CHEM 1035 or CHEM 1015), (MATH 1225 or MATH 1025)</i></i></i>		3
MINE 3624 Mineral Resource Project Management <sup>1</sup> <i>Pre: 2504, 2564</i>		3 <sup>[F]</sup>	MINE 3644 Applications in Mineral Processing		2 <sup>[S]</sup>
MINE 3534 Mineral Processing <i>Pre: 2504</i>		2 <sup>[F]</sup>	MINE 3544 Mineral Processing Lab <i>Pre: 3534</i>		1 <sup>[S]</sup>
ME 3134 Fundamentals of Thermodynamics <i>Pre: MATH 2214</i>		3 <sup>[F]</sup>	MINE 3564 Underground Mine Design <i>Pre: 2504, 3604</i>		3 <sup>[S]</sup>
MINE 3674 Explosives and Rock Fragmentation <i>Pre: 2504, GEOS 1004, ESM 2204</i>		3 <sup>[F]</sup>	MINE 3574 Surface Mine and Quarry Design <i>Pre: 2564, 3524</i>		3 <sup>[S]</sup>
			MINE 3584 Ventilation Engineering <i>Pre: 2504, ESM 3024</i>		3 <sup>[S]</sup>
			Pathways Concept 6a		3
<b>TOTAL</b>		<b>14</b>	<b>TOTAL</b>		<b>18</b>
FALL SEMESTER FOURTH YEAR		Credits	SPRING SEMESTER FOURTH YEAR		Credits
MINE 4614 Health and Safety Systems <sup>1</sup> <i>Pre: 3564 or 3574</i>		3 <sup>[F]</sup>	GEOS 4624 Mineral Deposits <i>Pre: 1004 or 2104 or 2024</i>		3
MINE 4635 Mining Engineering Capstone <i>Pre: 2544, 3564 or 3574, 3624</i>		2 <sup>[F]</sup>	MINE 4636 Mining Engineering Capstone <i>Pre: 4635</i>		2 <sup>[S]</sup>
ESM 3024 Introduction to Fluid Mechanics <i>Pre: ESM 2304, MATH 2204</i>		3 <sup>[F]</sup>	MINE 4644 Environmental Management for Mining and Geoenergy <sup>1</sup> <i>Pre: 3574</i>		2 <sup>[S]</sup>
MINE 4654 Mine Power Systems and Automation <i>Pre: MATH 2214</i>		3 <sup>[F]</sup>	Technical Elective		3-4
MINE 4664 Resource Engineering Leadership Seminar <i>Pre: Senior Standing</i>		1 <sup>[F]</sup>	Pathways Concept 3		3
Technical Elective		3-4			
<b>TOTAL</b>		<b>15-16</b>	<b>TOTAL</b>		<b>13-14</b>

**General Information about Checksheet:** Course offerings are subject to change and the availability of sufficient resources. Students should confirm course offerings in advance with their department. Superscripted annotation after course name. [1] indicates the course is a **core course for degree**. Superscripted annotation (F, S, SI, SII) in credits column indicates terms when a course is expected to be offered.

**Pathways to General Education (Pathways)**

Consult the pathways courses table: <https://www.pathways.prov.vt.edu/about/table.html>. Pathways courses must be completed prior to graduation

<b>Pathways Concept 1:</b> Discourse (6 hrs foundational, 3 hrs advanced)	<i>Foundational: ENGL 1105</i>	(3)	<i>Foundational: ENGL 1106</i>	(3)
	<i>Advanced: MINE 2544 + MINE 4635 + MINE 4636</i>			(3)
<b>Pathways Concept 2:</b> Critical Thinking in the Humanities (6 hrs)		(3)		(3)
<b>Pathways Concept 3:</b> Reasoning in the Social Sciences (6 hrs)		(3)		(3)
<b>Pathways Concept 4:</b> Reasoning in the Natural Sciences (8 hrs)	CHEM 1035 + 1045	(4)	PHYS 2305	(4)
<b>Pathways Concept 5:</b> Quantitative and Computational Thinking (11 hrs)	<i>Foundational: MATH 1225</i>	(4)	<i>Foundational: MATH 1226</i>	(4)
	<i>Advanced: MATH 2214</i>			(3)
<b>Pathways Concept 6:</b> Critique and Practice in Design and the Arts (7 hrs)	<i>Arts:</i>			(3)
	<i>Design: ENGE 1215 + ENGE 1216</i>			(4)
<b>Pathways Concept 7*:</b> Critical Analysis of Identity & Equity in the US (3 hrs)				(3)

\*Pathways 7 should be double counted with either Pathway 2 or 3 to avoid taking any additional credit hours.

**Change of Major Requirements:** Please see <http://www.enge.vt.edu/undergraduate-changing-majors.html>

**Foreign Language Requirements:** Students must have had 2 years of a foreign language in high school or one year at the college level (6 credit hours) of the same language. College-level credits used to meet this requirement do not count towards the degree.

**Satisfactory Progress Towards Degree:** University Policy 91 outlines university-wide minimum criteria to determine if students are making satisfactory progress towards the completion of their degrees. The MINE Department fully supports this policy. Specific expectations for satisfactory progress for Mining Engineering majors are as follows:

- Each student must meet the minimum University-wide criteria as described in Policy 91 and summarized in the Undergraduate Catalog (<http://www.undergradcatalog.registrar.vt.edu/1617/academic-policies.html#22>)
- After having completed 72 credit hours (including transfer, advanced placement, advanced standing, and credit by examination) a student must:
  - Maintain an overall and in major GPA of 2.0 or better. (In-major GPA is calculated using all courses taken under the MINE designator)
  - Have passing grades in MINE 2504, MATH 2204 and MATH 2214.

**Statement of Hidden Prerequisites:** Prerequisites for each course are listed after the course title. The (letter grade) notation, such as (C-), indicates the minimum grade students must earn in the pre-requisite course. There are no hidden pre-requisites in the program of study. Prerequisites may change from what is indicated. Be sure to consult the University Catalog or check with your advisor for the most current pre-requisites.

**Graduation Requirements:** Each student must complete at least 127 semester credit hours with a minimum overall GPA of 2.00 and a minimum in-major GPA of 2.00. In-major GPA is determined from all courses with MINE designator.

**B.S. in Mining Engineering  
Technical Electives**

Courses with substantial duplication of courses taken previously will not qualify for credit. Independent Study (4974) and Undergraduate Research (4994) may not be used as electives

Choose from the courses listed below, noting that some courses are not available to all students because they may have prerequisites or be restricted to major in the offering department.

All Technical Elective courses are 3 credit hours unless designated otherwise.

- BSE 4394 – Water Supply and Sanitation in Developing Countries *Pre: Junior Senior Standing*
- CEE 3104 - Intro to Environmental Engineering *C- or better in Pre: CHEM 1035, CHEM 1045, (MATH 1026 or MATH 1206 or MATH 1206H or MATH 1226 or MATH 2016 or MATH 2024), (PHYS 2305 or PHYS 2205)*
- CEE 4264 - Sustainable Land Development *Pre: Senior Standing*
- CEE 4144 - Air Resources Engr *Pre: CEE 3104 or ENGR 3124 or GEOS 3114 or ENSC 3634*
- CEE 3514 - Introduction to Geotechnical Engineering *Pre: GEOS 2104 and ESM 2204 (4 cr.)*
- CEE 4514 - Methods in Geotechnical Engineering *Pre: 3514 (C-)*
- ECON 4014 - Environmental Economics *Pre: 2005 or 2116 or 2126 or 2025H*
- ENSC/CSES 3634 - Physics of Pollution *Pre: 3114, PHYS 2205, MATH 2016 or MATH 2024*
- CSES 4644 - Land-based Systems for Waste Treatment
- ENSC/CSES 4774 - Reclamation of Drastically Disturbed Lands *Pre: CSES 3114 or ENSC 3114 or GEOS 3614 or CSES 3134 or ENSC 3134 or CSES 3304 or GE OG 3304 or GEOS 3304*
- FIN 3104 - Introduction to Finance *Pre: ACIS 2115, (BIT 2405 or STAT 3005 or STAT 3604 or STAT 4604 or STAT 4705 or STAT 4714 or STAT 3615 or STAT 3616), (ECON 2005 or ECON 2025H)*
- FIN 3134 - Financial Analytics *Pre: (ECON 2005 or ECON 2025H), ACIS 2115, (BIT 2405 or STAT 3005 or STAT 3604 or STAT 4604 or STAT 4705 or STAT 4714 or STAT 3615 or STAT 3616). Co: ACIS 2504*
- FIN 3144 - Investments, Debt, Equity and Derivatives *Pre: 3134 Jr. Standing*
- FIN 3154 - Corporate Finance *Pre: 3134 (C)*
- FIN 4144 - International Financial Management *Pre: 3104*
- FIN 4214 - Financial Modeling in Excel *Pre: 3144*
- FREC/NR 4014 Natural Resources Economics *Pre: ECON 2005 or AAEC 1005*
- GEOG/GEOS 4354 - Introduction to Remote Sensing
- GEOS 3014 - Environmental Geosciences *Pre: 1004 or 1024 or 2024 or 2104*
- GEOS 3204 - Sedimentology-Stratigraphy *Pre: 1004 or 2024 or 2104*
- GEOS 3504 (MSE 3104) - Mineralogy *Pre: CHEM 1035*
- GEOS 3614 (ENSC 3114) (CSES 3114) - Soils *Pre: CHEM 1036*
- GEOS 4164 - Potential Field Methods in Exploration Geophysics *Pre: 3104, MATH 2204, MATH 2214, PHYS 2305 (4 cr.)*
- GEOS 4404 - Advanced Structural Geology *Pre: 3404*
- GEOS 4634 - Environmental Geochemistry *Pre: MATH 1225, CHEM 1035*
- GEOS 4804 - Groundwater Hydrology *Pre: (MATH 1226 or MATH 2024), (PHYS 2205 or PHYS 2305)*
- ISE 4004 - Theory of Organization
- ISE 4654 - Principles of Industrial Hygiene
- MGT 3304 - Management Theory & Leadership Practice *Pre: Sophomore Standing*
- MGT 4314 - International Management *Pre: Junior Standing*
- MINE 2714 - Introduction to Petroleum and Natural Gas Engineering
- MINE 3714 - Petroleum and Natural Gas Reservoir Engineering *Pre: 2714*
- MINE 3724 - Formation Evaluation and Engineering *Pre: 2714*
- MINE 4714 - Well Drilling and Completion Engineering *Pre: 2714*
- MINE 4724 - Petroleum and Natural Gas Production Engineering *Pre: 2714*
- MINE 4734 - Mine Ventilation System Analysis *Pre: 3584*
- MINE 4744 - Sustainable Development of Mineral and Energy Resources *Pre: Junior Standing*
- MINE 4754 - Stability of Rock Slopes *Pre: 3604*
- MINE 4764 - Particulate Process Engineering *Pre: 3644*
- MSE 3304 - Physical Metallurgy *Pre: MSE 2044*
- PSYC 3024 - Human Behaviors and Natural Environments *Pre: 1004*
- PSYC 3054 - Health Psychology *Pre: 1004 or 2004*
- UAP 3354 - Introduction to Environmental Policy and Planning
- UAP 4264 - Environmental Ethics & Policy *Pre: Junior or Senior Standing*
- UAP 4374 - Land Use & Environment: Planning & Policy *Pre: Junior Standing*