

College of Engineering  
Department of Mining and Minerals Engineering  
Degree: Bachelor of Science in Mining Engineering  
Major: Mining Engineering  
For students entering UG Catalog 2023-2024  
Credits Required for Graduation: 128

FALL SEMESTER FIRST YEAR		Credits	SPRING SEMESTER FIRST YEAR		Credits
CHEM 1035 General Chemistry <sup>2</sup> Pre: Eligible to enroll	3		ENGL 1106 First-Year Writing <sup>2</sup> Pre: ENGL 1105	3	
CHEM 1045 General Chemistry Lab <sup>2</sup> Co: CHEM 1035	1		MATH 1226 Calculus of a Single Variable <sup>2</sup> Pre: MATH 1225	4	
ENGL 1105 First-Year Writing <sup>2</sup>	3		MATH 2114 Introduction to Linear Algebra <sup>~</sup> Pre: (MATH 1225 (B) or MATH 1226)	3	
MATH 1225 Calculus of a Single Variable <sup>2</sup> (C-) Pre: Eligible to enroll	4		PHYS 2305 Foundations of Physics <sup>2</sup> Pre: (MATH 1205 or 1205H or 1225) or (MATH 1206 or MATH 1206H or 1226)	4	
ENGE 1215 Foundations of Engineering <sup>2~</sup>	2		ENGE 1216 Foundations of Engineering <sup>2~</sup> Pre: ENGE 1215	2	
Pathways Concept 2 <sup>2</sup> (7)*	3		Pathways Concept 2 <sup>2</sup> (7)*	3	
<b>TOTAL</b>	<b>16</b>		<b>TOTAL</b>	<b>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 Pre: (ESM 2104 or ESM 2114), (MATH 2204 or MATH 2204H)	3	
GEOS 1104 Intro to Earth Sciences Lab	1		ESM 2304 Dynamics Pre: (ESM 2104 or ESM 2114), (MATH 2204 or MATH 2204H); Co: MATH 2214	3	
MATH 2204 Intro to Multivariable Calculus <sup>~</sup> Pre: MATH 1226	3		MATH 2214 Introduction to Differential Equations <sup>2~</sup> Pre: (MATH 1114 or MATH 2114 or MATH 2114H or MATH 2405H or ISC 2105), MATH 1226	3	
ESM 2104 Statics Pre: MATH 1226. Co: MATH 2204 or MATH 2204H or MATH 2406H	3		MINE 2544 Leadership for Responsible Mining <sup>2</sup> Co: 2504, Pre: ENGL 1106	2 <sup>[S]</sup>	
MINE 2504 Intro to Mining Engineering <sup>1</sup>	3 <sup>[F,S]</sup>		MINE 2564 Resource Exploration and Design <sup>1</sup> Co: 2504, Pre: GEOS 2504	3 <sup>[S]</sup>	
MINE 2534 Mine Surveying and Mapping Pre: MATH 1226	3 <sup>[F]</sup>		Pathways Concept 3 <sup>2</sup> or (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> Pre: 2504, ESM 2204, GEOS 1004	3 <sup>[F]</sup>		GEOS 3404 Elements of Structural Geology Pre: (GEOS 1004 or GEOS 2024 or GEOS 2104)—OR—GEOS 4824 Engineering Geology Pre: (GEOS 1004 or GEOS 2024 or GEOS 2104), (PHYS 2305 or PHYS 2205), (CHEM 1035 or CHEM 1015), (MATH 1225 or MATH 1025)	3	
MINE 3624 Mineral Resource Project Management <sup>1</sup> Pre: 2504, 2564	3 <sup>[F]</sup>		MINE 3644 Applications in Mineral Processing Pre: 3634	2 <sup>[S]</sup>	
MINE 3634 Fundamentals of Mineral Processing Pre: 2504, CHEM 1035, GEOS 1004	3 <sup>[F]</sup>		MINE 3564 Underground Mine Design <sup>1</sup> Pre: 2564, 3604	3 <sup>[S]</sup>	
MINE 3664 Fluids and Thermodynamics for Resources Pre: ESM 2304, MATH 2214	3 <sup>[F]</sup>		MINE 3574 Surface Mine and Quarry Design <sup>1</sup> Pre: 2564, 3674	3 <sup>[S]</sup>	
MINE 3674 Explosives and Rock Fragmentation Pre: 2504, GEOS 1004, ESM 2204	3 <sup>[F]</sup>		MINE 3584 Ventilation Engineering Pre: 2504	3 <sup>[S]</sup>	
			Pathways Concept 6a2 (7)*	3	
<b>TOTAL</b>	<b>15</b>		<b>TOTAL</b>	<b>17</b>	
FALL SEMESTER FOURTH YEAR		Credits	SPRING SEMESTER FOURTH YEAR		Credits
MINE 4614 Health and Safety Systems <sup>1</sup> Pre: (3564 or 3574)	3 <sup>[F]</sup>		GEOS 4624 Mineral Deposits Pre: (GEOS 1004 or GEOS 2104 or GEOS 2024)	3	
MINE 4635 Mining Engineering Capstone <sup>2</sup> Pre: 2544, (3564 or 3574), 3624	2 <sup>[F]</sup>		MINE 4636 Mining Engineering Capstone <sup>2</sup> Pre: 4635	2 <sup>[S]</sup>	
MINE 4624 Mine and Reservoir Water Engineering Pre: 3664, (3564 or 3574)	3 <sup>[F]</sup>		MINE 4644 Environmental Management for Mining and Geoenergy <sup>1</sup> Pre: (3564 or 3574)	2 <sup>[S]</sup>	
MINE 4654 Mine Power Systems and Automation Pre: MATH 2214	3 <sup>[F]</sup>		Technical Elective	3	
MINE 4664 Resource Engineering Leadership Seminar Pre: Senior Standing	1 <sup>[F]</sup>		Pathways Concept 3 <sup>2</sup> (7)*	3	
Technical Elective	3				
<b>TOTAL</b>	<b>15</b>		<b>TOTAL</b>	<b>13</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. <sup>1</sup>Superscript and green color indicates the course is a **MINE core course for degree**. <sup>2</sup>Superscript and beige color indicates the course is a **Pathways Concept Course**. Superscripted annotation (F, S, SI, SII) in credits column indicates terms when a course is expected to be offered.

### Pathways General Education (Pathways)

Consult the pathways courses table: <https://www.pathways.prov.vt.edu/students-and-advisors/pathways-guides.html>. Pathways courses need to 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 Pathways 2, 3 or 6a to avoid taking any additional credit hours.

**Change of Major Requirements:** Please see <https://eng.vt.edu/em>.

**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:** Each student must meet the minimum University wide criteria as described for satisfactory progress and summarized in the Undergraduate Catalog (under Academic Policies -> University Policies Governing Enrollment -> Satisfactory Progress). 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. Passing grade is anything higher than F.

**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 128 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.

~Additional checksheet comments:

- ENGE 1414 (4 cr) may be substituted for ENGE 1215 (2 cr) + ENGE 1216 (2 cr).
- MATH 2405H (5 cr) may be substituted for MATH 2214 (3 cr).
- MATH 2405H (5 cr) + MATH 2406H (5 cr) may be substituted for MATH 2214 (3 cr) + MATH 2204 (3 cr) + MATH 2214 (3 cr).

**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. Additional technical electives may be used as a substituted course through a 4984 or 5984 special topics course with the review and approval from the department head.

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: 3274, Senior Standing*

CEE 4144 - Air Resources Engr *Pre: (CEE 3104 or ENGR 3124 or GEOS 3114 or ENSC 3634), Senior Standing*

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 3634 - Physics of Pollution *Pre: CSES 3114, PHYS 2206, (MATH 2013 or 2024)*

CSES 4644 - Land-based Systems for Waste Treatment

ENSC 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, Pre: (ACIS 2115 and ECON 2005 and BIT 2405) or (ACIS 2115 and ECON 2005 and CMDA 2005) or (ACIS 2115 and ECON 2005 and STAT 3005) or (ACIS 2115 and ECON 2005 and STAT 3604) or (ACIS 2115 and ECON 2005 and STAT 3615 and STAT 3616) or (ACIS 2115 and ECON 2005 and STAT 4604) or (ACIS 2115 and ECON 2005 and STAT 4705 and STAT 4706) or (ACIS 2115 and ECON 2005 and STAT 4714) or (ACIS 2115 and ECON 2025H and BIT 2405) or (ACIS 2115 and ECON 2025H and CMDA 2005) or (ACIS 2115 and ECON 2025H and STAT 3005) or (ACIS 2115 and ECON 2025H and STAT 3604) or (ACIS 2115 and ECON 2025H and STAT 3615 and STAT 3616) or (ACIS 2115 and ECON 2025H and STAT 4604) or (ACIS 2115 and ECON 2025H and STAT 4705 and STAT 4706) or (ACIS 2115 and ECON 2025H and STAT 4714), Sophomore Standing*

FIN 3134 - Financial Analytics *Pre: (ACIS 2115 and ECON 2005 and BIT 2405) or (ACIS 2115 and ECON 2005 and CMDA 2005) or (ACIS 2115 and ECON 2005 and STAT 3005) or (ACIS 2115 and ECON 2005 and STAT 3604) or (ACIS 2115 and ECON 2005 and STAT 3615 and STAT 3616) or (ACIS 2115 and ECON 2005 and STAT 4604) or (ACIS 2115 and ECON 2005 and STAT 4705 and STAT 4706) or (ACIS 2115 and ECON 2005 and STAT 4714) or (ACIS 2115 and ECON 2025H and BIT 2405) or (ACIS 2115 and ECON 2025H and CMDA 2005) or (ACIS 2115 and ECON 2025H and STAT 3005) or (ACIS 2115 and ECON 2025H and STAT 3604) or (ACIS 2115 and ECON 2025H and STAT 3615 and STAT 3616) or (ACIS 2115 and ECON 2025H and STAT 4604) or (ACIS 2115 and ECON 2025H and STAT 4705 and STAT 4706) or (ACIS 2115 and ECON 2025H and STAT 4714), Sophomore Standing*

FIN 3144 - Investments, Debt, Equity and Derivatives *Pre: 3134, Sophomore Standing*

FIN 3154 - Corporate Finance *Pre: 3134, Sophomore Standing*

FIN 4144 - International Financial Management *Pre: 3104, 3134*

FIN 4214 - Financial Modeling in Excel *Pre: 3134, 3144, 3154*

FREC/NR 4014 Natural Resources Economics *Pre: ECON 2005 or AAEC 1005*

GEOG/GEOS 4354 - Introduction to Remote Sensing

GEOS 3014 - Environmental Geosciences

GEOS 3204 - Sedimentology-Stratigraphy *Pre: 1004 or 2024 or 2104*

GEOS 3504 (MSE 3104) - Mineralogy *Pre: CHEM 1035*

GEOS 3614 (CSES 3114) - Soils *Pre: CHEM 1036*

GEOS 4164 - Potential Field Methods in Exploration Geophysics *Pre: 3104, (MATH 2204 or MATH 2204H), MATH 2214, PHYS 2306*

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*

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*