

MINING ENGINEERING MAJOR

Program Curriculum

Code	Title	Credits
Degree Core Requirements		
MINE 2504	Introduction to Mining Engineering	3
MINE 2564	Resource Exploration and Design	3
MINE 3604	Mining Geomechanics	3
MINE 3624	Mineral Resource Project Management	3
MINE 3564	Underground Mine Design	3
MINE 3574	Surface Mine and Quarry Design	3
MINE 4614	Health and Safety Systems	3
MINE 4644	Environmental Management for Mining and Geoenery	2
Subtotal		23
Additional Course Requirements		
MATH 2114	Introduction to Linear Algebra	3
GEOS 1004	Earth Science: Our Past, Present, and Future	3
GEOS 1104	Introduction to Earth Sciences Laboratory	1
MATH 2204	Introduction to Multivariable Calculus	3
ESM 2104	Statics	3
MINE 2534	Mine Surveying and Mapping	3
ESM 2204	Mechanics of Deformable Bodies	3
ESM 2304	Dynamics	3
MINE 3634	Fundamentals of Mineral Processing	3
MINE 3664	Fluids and Thermodynamics for Resources	3
MINE 3674	Explosives and Rock Fragmentation	3
GEOS 3404	Elements of Structural Geology	3
or GEOS 4824	Engineering Geology	
MINE 3644	Applications in Mineral Processing	2
MINE 3584	Ventilation Engineering	3
MINE 4624	Mine and Water Reservoir Engineering	3
MINE 4654	Mine Power Systems and Automation	3
MINE 4664	Resource Engineering Leadership Seminar	1
GEOS 4624	Mineral Deposits	3
Technical Electives		6
Subtotal		55
Pathways to General Education		
<i>Pathways Concept 1 - Discourse</i>		
ENGL 1105	First-Year Writing (1F)	3
ENGL 1106	First-Year Writing (1F)	3
MINE 2544	Leadership for Responsible Mining (1A)	2
MINE 4635	Mining Engineering Capstone (1A)	2
MINE 4636	Mining Engineering Capstone (1A)	2
<i>Pathways Concept 2 - Critical Thinking in the Humanities</i>		
Select six hours in Pathway 2 (https://catalog.vt.edu/course-search/?attrs_pathways=attrs_pathways_G02)		6
<i>Pathways Concept 3 - Reasoning in the Social Sciences</i>		
Select six hours in Pathway 3 (https://catalog.vt.edu/course-search/?attrs_pathways=attrs_pathways_G03)		3
<i>Pathways Concept 4 - Reasoning in the Natural Sciences</i>		
CHEM 1035	General Chemistry	3

CHEM 1045	General Chemistry Laboratory	1
PHYS 2305	Foundations of Physics	4
<i>Pathways Concept 5 - Quantitative and Computational Thinking</i>		
MATH 1225	Calculus of a Single Variable (5F ; C-)	4
MATH 1226	Calculus of a Single Variable (5F)	4
MATH 2214	Introduction to Differential Equations (5A)	3
<i>Pathways Concept 6 - Critique and Practice in Design and the Arts</i>		
Select three hours in Pathway 6a (https://catalog.vt.edu/course-search/?attrs_pathways=attrs_pathways_G06A)		3
ENGE 1215	Foundations of Engineering (C-)	2
ENGE 1216	Foundations of Engineering (C-)	2
<i>Pathways Concept 7 - Critical Analysis of Identity and Equity in the United States</i>		
Pathways 7 should be double counted with either Pathways 2, 3 or 6a to avoid taking any additional credit hours.		3
Subtotal		50
Total Credits		128

Technical Electives

Courses with substantial duplication of courses taken previously will not qualify for credit. MINE 4974 Independent Study and MINE 4994 Undergraduate Research may not be used as electives. Additional technical electives may be used as a substituted course through a 4984 or 5984 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 majors in the offering department.

Code	Title	Credits
BSE 4394	Water Supply and Sanitation in Developing Countries	3
CEE 3104	Introduction to Environmental Engineering	3
CEE 4264	Sustainable Land Development	3
CEE 4144	Air Resources Engineering	3
CEE 3514	Introduction to Geotechnical Engineering	4
CEE 4514	Methods in Geotechnical Engineering	3
ECON 4014	Environmental Economics	3
ENSC 3634	Physics of Pollution	3
CSES 4644	Land-based Systems for Waste Treatment	3
ENSC 4774	Reclamation of Drastically Disturbed Lands	3
FIN 3104	Introduction to Finance	3
FIN 3134	Financial Analytics	3
FIN 3144	Investments: Debt, Equity and Derivatives	3
FIN 3154	Corporate Finance	3
FIN 4144	International Financial Management	3
FIN 4214	Financial Modeling in Excel	3
FREC 4014	Natural Resources Economics	3
GEOG 4354	Introduction to Remote Sensing	3
GEOS 3014	Environmental Geosciences	3
GEOS 3204	Sedimentology-Stratigraphy	3
GEOS 3504	Mineralogy	3
GEOS 3614	Soils	3
GEOS 4164	Potential Field Methods in Exploration Geophysics	4
GEOS 4404	Advanced Structural Geology	3

GEOS 4634	Environmental Geochemistry	3
GEOS 4804	Groundwater Hydrology	3
ISE 4004	Theory of Organization	3
ISE 4654	Principles of Industrial Hygiene	3
MGT 3304	Management Theory and Leadership Practice	3
MGT 4314	International Management	3
MINE 2714	Introduction to Petroleum and Natural Gas Engineering	3
MINE 3714	Petroleum and Natural Gas Reservoir Engineering	3
MINE 3724	Formation Evaluation and Engineering	3
MINE 4714	Well Drilling and Completion Engineering	3
MINE 4724	Petroleum and Natural Gas Production Engineering	3
MSE 3304	Physical Metallurgy	3
PSYC 3024	Human Behaviors and Natural Environments	3
PSYC 3054	Health Psychology	3
UAP 3354	Introduction to Environmental Policy and Planning	3
UAP 4264	Environmental Ethics and Policy	3
UAP 4374	Land Use and Environment: Planning and Policy	3

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.

Pathways to General Education (Pathways)

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

Change of Major Requirements

Please see <https://eng.vt.edu/em> (<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 Introduction to Mining Engineering, MATH 2204 Introduction to Multivariable Calculus and MATH 2214 Introduction to Differential Equations.

Statement of Hidden Prerequisites

Prerequisites for each course are listed. 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.

Substitutions

- ENGE 1414 Foundations of Engineering Practice may be substituted for ENGE 1215 Foundations of Engineering and ENGE 1216 Foundations of Engineering
- MATH 2405H Mathematics in a Computational Context may be substituted for MATH 2114 Introduction to Linear Algebra
- MATH 2405H Mathematics in a Computational Context and MATH 2406H Mathematics in a Computational Context may be substituted for MATH 2114 Introduction to Linear Algebra, MATH 2204 Introduction to Multivariable Calculus, and MATH 2214 Introduction to Differential Equations

Roadmap

Course	Title	Credits
First Year		
Fall Semester		
CHEM 1035	General Chemistry	3
CHEM 1045	General Chemistry Laboratory	1
ENGL 1105	First-Year Writing	3
MATH 1225	Calculus of a Single Variable (C-)	4
ENGE 1215	Foundations of Engineering (C-)	2
Pathways Concept 2		3
		Credits
		16
Spring Semester		
ENGL 1106	First-Year Writing	3
MATH 1226	Calculus of a Single Variable	4
MATH 2114	Introduction to Linear Algebra	3
PHYS 2305	Foundations of Physics	4
ENGE 1216	Foundations of Engineering (C-)	2
Pathways Concept 2		3
		Credits
		19
Second Year		
Fall Semester		
GEOS 1004	Earth Science: Our Past, Present, and Future	3
GEOS 1104	Introduction to Earth Sciences Laboratory	1
MATH 2204	Introduction to Multivariable Calculus	3
ESM 2104	Statics	3
MINE 2504	Introduction to Mining Engineering	3
MINE 2534	Mine Surveying and Mapping	3
		Credits
		16
Spring Semester		
ESM 2204	Mechanics of Deformable Bodies	3
ESM 2304	Dynamics	3
MATH 2214	Introduction to Differential Equations	3
MINE 2544	Leadership for Responsible Mining	2
MINE 2564	Resource Exploration and Design	3
Pathways Concept 3 or 7		3
		Credits
		17
Third Year		
Fall Semester		
MINE 3604	Mining Geomechanics	3

MINE 3624	Mineral Resource Project Management	3
MINE 3634	Fundamentals of Mineral Processing	3
MINE 3664	Fluids and Thermodynamics for Resources	3
MINE 3674	Explosives and Rock Fragmentation	3
Credits		15
Spring Semester		
GEOS 3404 or GEOS 4824	Elements of Structural Geology or Engineering Geology	3
MINE 3644	Applications in Mineral Processing	2
MINE 3564	Underground Mine Design	3
MINE 3574	Surface Mine and Quarry Design	3
MINE 3584	Ventilation Engineering	3
Pathways Concept 6a		3
Credits		17
Fourth Year		
Fall Semester		
MINE 4614	Health and Safety Systems	3
MINE 4635	Mining Engineering Capstone	2
MINE 4624	Mine and Water Reservoir Engineering	3
MINE 4654	Mine Power Systems and Automation	3
MINE 4664	Resource Engineering Leadership Seminar	1
Technical Elective		3
Credits		15
Spring Semester		
GEOS 4624	Mineral Deposits	3
MINE 4636	Mining Engineering Capstone	2
MINE 4644	Environmental Management for Mining and Geenergy	2
Technical Elective		3
Pathways Concept 3		3
Credits		13
Total Credits		128