

# Bachelor of Science in Geology

Required 120 credits (36 of which must be numbered 300 or above) including:

I. Essential Studies requirements (see University ES listing).

II. Geology required courses

Code	Title	Credits
GEOL 101 & 101L	Introduction to Geology and Introduction to Geology Laboratory	4
GEOL 102 & 102L	The Earth Through Time and The Earth Through Time Laboratory	4
GEOL 311	Geomorphology	4
GEOL 318 & 318L	Mineralogy and Mineralogy Lab	3
GEOL 320 & 320L	Petrology and Petrology Lab	3
GEOL 330	Structural Geology	3
GEOL 356	Geoscience Lectures	1
GEOL 411 & 411L	Sedimentology and Stratigraphy and Sedimentology and Stratigraphy Lab	4
GEOL 420	Geology Capstone	3
GEOL 421	Seminar I	1
GEOL 422	Seminar II	1
GEOL 487	Research I	1
GEOL 488	Research II	2
GEOL 494	Senior Thesis	1
<b>Geology Field Experience <sup>1</sup></b>		<b>3</b>
<b>Select two of the following:</b>		<b>6-7</b>
GEOL 321	Geochemistry	
GEOL 414	Applied Geophysics	
GEOL 415 & 415L	Introduction to Paleontology and Introduction to Paleontology Lab	
GEOE 417	Hydrogeology	
<b>Total Credits</b>		<b>44-45</b>

III. Program Required Electives

Code	Title	Credits
<b>Elective course options <sup>2</sup></b>		<b>22-24</b>
Atmospheric science - any courses greater than ATSC 100		
Biology - any course greater than BIOL 150		
Chemistry - any course greater than CHEM 200		
Engineering - any course within any Engineering department		
Earth System Science and Policy - any courses within ESSP		
Entrepreneurship - any ENTR courses		
Geography - any courses greater than GEOG 134		
Languages - any LANG courses		
Math - any courses greater than MATH 207		
Physics - any courses greater than PHYS 252		
Space Studies - any courses greater than SPST 200		

IV. Requirements outside of the College of Engineering and Mines

Code	Title	Credits
CHEM 121 & 121L	General Chemistry I and General Chemistry I Laboratory	4
CHEM 122 & 122L	General Chemistry II and General Chemistry II Laboratory	4
MATH 165	Calculus I	4

MATH 166	Calculus II	4
PHYS 211	College Physics I	4
or PHYS 251	University Physics I	
PHYS 212	College Physics II	4
or PHYS 252	University Physics II	
<b>Select one of the following</b>		<b>3-4</b>
MATH 265	Calculus III	
MATH 321	Applied Statistical Methods	
ECON 210	Introduction to Business and Economic Statistics	
<b>Total Credits</b>		<b>27-28</b>

- <sup>1</sup> Geology Field Experience credits must be pre-approved by the department and may be satisfied by successfully completing a total of 3 credits including, but not limited to: approved professional field camps, GEOL 491, GEOE 397, and internships
- <sup>2</sup> Other courses may be petitioned by student and approved by the advisor that cater to the student's interest and career plans.
- <sup>3</sup> Students must ensure all appropriate pre-requisites are met prior to registering for all courses in the curriculum.

## Concentration in Petroleum Geology

Geology is a critically important discipline in the exploration for and extraction of petroleum. These activities require skills in visualizing and understanding the sedimentary rocks especially those in the subsurface. The range of typical applications is wide and the methods used are diverse. Expertise provided by this concentration include aspects of sedimentary geology, stratigraphy, structural geology and geophysics. This expertise is highly sought after by industries and government agencies that find and produce the oil that fuels today's economies. Furthermore, it has become equally important to train replacements for an aging workforce in this important technological area. The concentration in Petroleum Geology is designed to prepare students for careers as petroleum geologists.

Students must complete a minimum of 16 credits from the following list:

Code	Title	Credits
GEOE 301 & 301L	Petrophysics and Petrophysics Laboratory	4
GEOL 321	Geochemistry	3
GEOL 407	Petroleum Geology	3
GEOL 415	Introduction to Paleontology	4
GEOL 500	Sedimentary Geology	3
GEOL 518	Topics in Advanced Stratigraphy	2-4
PTRE 401	Well Logging	3

## Concentration in Water Resources

Freshwater is a vital resource for economic growth, global ecosystems and well-being of human lives. Recently water resources are also severely under pressure across the world due to substantial population growth and migration, climate and land-use changes, and anthropogenic pollutions. Water security and quality are increasingly also recognized as a critical national security priority. Moreover, water management is becoming increasingly complex and complicated, demanding a thorough and sound understanding of hydrologic and hydrogeologic processes and their vulnerabilities to climate, land-use changes and anthropogenic usages. These interactions require the skills in visualizing and understanding water and contaminant transport through subsurface rocks (sedimentary, igneous and metamorphic) and surface waterways. The range of typical applications is wide and the methods used are diverse. Expertise provided by this concentration includes aspects of hydrogeology, groundwater contamination and remediation, water quality and lab analyses and cold region hydrology. This expertise is highly sought after by industries and government agencies that deal with critical water resources and environmental problems. Furthermore, it has become equally important to train replacements for an aging workforce in this important technological area. The concentration in Water Resources is designed to prepare students for careers

such as hydrogeologist, hydrologist, environmental geologist and environmental engineer.

Students must complete a minimum of 16 credits from the following list:

Code	Title	Credits
GEOL 321	Geochemistry	3
GEOL 342	Conservation and Environmental Hydrology	3
GEOL 540	Water Sampling and Analysis	3
GEOE 417	Hydrogeology	3
GEOE 419	Groundwater Monitoring and Remediation	3
GEOE 421	Cold Region Hydrologic Modeling	3

## Teacher Certification

Students seeking secondary teacher certification in Geology must complete the Department of Teaching and Learning Requirements in Secondary Education. Students seeking certification should follow the curriculum for the B.S. in Geology and select Statistics (PSYC 241 Statistics for the Behavioral Sciences, MATH 321 Applied Statistical Methods) rather than MATH 265 Calculus III or Computer Science. The 24 additional hours in science, computer science, statistics, engineering, mathematics, or a worldlanguage must include each of the following: at least one course in Biology with lab equaling 4 credits, Atmospheric Sciences, and Astronomy.

Geology majors seeking secondary certification must have an adviser both in the Department of Geology and Geological Engineering and in the Department of Teaching and Learning. Formal admission to Teacher Education is required and is normally sought while the student is enrolled in T&L 250 Introduction to Education (see Department of Teaching and Learning (<https://catalog.und.edu/undergraduateacademicinformation/departmentalcoursesprograms/teachingandlearning/>) listing).