

# PETROLEUM AND NATURAL GAS ENGINEERING, BACHELOR OF SCIENCE (BS)

## Program Learning Outcomes

Upon graduation, students will have:

- An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
- An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
- An ability to communicate effectively with a range of audiences
- An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
- An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
- An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
- An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

## Related Links

Petroleum and Natural Gas Engineering, BS Program Page (<https://www.sru.edu/academics/majors-and-minors/petroleum-and-natural-gas-engineering/>)

Petroleum and Natural Gas Engineering Fact Sheet URL (<https://www.sru.edu/documents/programs/factsheets/undergraduate/PNGE-fs.pdf>)

Professional Licensure/Certification Page (<https://www.sru.edu/students/student-consumer-information/professional-licensures/>)

## Curriculum Guide

### GPA Requirement

Major GPA: 2.0 or higher  
Overall GPA: 2.0 or higher

### Summary\*

Code	Title	Hours
	Rock Studies 2 Requirements	41
	Other Basic Requirements	0-3
	Major Requirements	84
	Natural Science and Math College-Wide Requirements	12
	Elective	3

\* All undergraduate degree programs require a minimum of 120 credits. Some courses meet multiple requirements, but are only counted once toward the 120 credit total required to graduate.

## Rock Studies 2 Requirements

Code	Title	Hours
<b>The Rock</b>		
SUBJ 139	Foundations of Academic Discovery <sup>1</sup>	3
ENGL 102	Critical Writing	3
ENGL 104	Critical Reading	3
MATH 225	Calculus I	4
Select one of the following:		3
COMM 200	Civil Discourse: Theory & Practice	
PHIL 110	Ethics and Civil Discourse	
POLS 235	Civil Discourse and Democracy	
Subtotal		16
<b>Integrated Inquiry</b>		
<i>Creative and Aesthetic Inquiry</i>		
Select 3 Credits ( <a href="https://catalog.sru.edu/undergraduate/rock-studies/rock-studies-program/">https://catalog.sru.edu/undergraduate/rock-studies/rock-studies-program/</a> )		3
<i>Humanities Inquiry</i>		
Select 3 Credits ( <a href="https://catalog.sru.edu/undergraduate/rock-studies/rock-studies-program/">https://catalog.sru.edu/undergraduate/rock-studies/rock-studies-program/</a> )		3
<i>Social Science Inquiry</i>		
Select 3 Credits ( <a href="https://catalog.sru.edu/undergraduate/rock-studies/rock-studies-program/">https://catalog.sru.edu/undergraduate/rock-studies/rock-studies-program/</a> )		3
<i>Natural Sciences Inquiry</i>		
CHEM 107	General Chemistry I	3
CHEM 111	General Chemistry I Lab	1
<i>Physical Sciences Inquiry</i>		
PHYS 216	University Physics 1 with Lab	4
Subtotal		17
<b>Additional Rock Studies 2 Requirements</b>		
Required Thematic Thread Coursework:		
MATH 230	Calculus II	4
PHYS 217	University Physics 2 with Lab	4
Subtotal		8
<b>Total Hours</b>		<b>41</b>

<sup>1</sup> Course offered in multiple subjects; cannot take course in first major subject.

## Basic Math Requirement

Check with your adviser or a current degree audit report to see if you have been exempted from this course. The credit earned in this course will not be counted toward the 120 credit hour minimum needed to earn a degree.

Code	Title	Hours
Complete one of the following:		0-3
Meet required minimum SAT or ACT math score OR		
ESAP 110	Beginning Algebra	
<b>Total Hours</b>		<b>0-3</b>

## DIVERSITY, EQUITY, AND INCLUSION REQUIREMENT

Students must take and pass a course with the Diversity, Equity, and Inclusion (DEI) designation prior to graduation. Students can meet this requirement by taking any DEI - designated course in any program at any time during their undergraduate career.

### Major Requirements

- 42 major credits must be taken at SRU or PASSHE
- 42 major credits must be taken at the 300 level or above

Code	Title	Hours
<b>Required Engineering Courses</b>		
ENGR 110	Introduction to Engineering <sup>1</sup>	2
ENGR 120	Engineering Design Tools <sup>1</sup>	2
ENGR 130	Engineering Computing Tools	2
ENGR 210	Statics	3
ENGR 230	Mechanics of Materials	3
ENGR 301	Fluid Mechanics <sup>1</sup>	3
ENGR 320	Thermodynamics <sup>1</sup>	3
ENGR 340	Engineering Economics	3
PNGE 201	Introduction to Petroleum and Natural Gas Engineering <sup>1</sup>	1
PNGE 312	Petrophysics <sup>1</sup>	4
PNGE 315	Reservoir Fluids <sup>1</sup>	3
PNGE 325	Reservoir Engineering <sup>1</sup>	3
PNGE 410	Drilling engineering with Lab <sup>1</sup>	4
PNGE 420	Production Engineering <sup>1</sup>	3
PNGE 430	Reservoir Simulation <sup>1</sup>	3
PNGE 432	Formation Evaluation <sup>1</sup>	3
PNGE 435	Pressure Transient Analysis <sup>1</sup>	3
PNGE 440	Hydraulic Fracturing <sup>1</sup>	3
PNGE 441	Oil and Natural Gas Resource Valuation and Economics <sup>1</sup>	3
PNGE 459	Petroleum and Natural Gas Design/Capstone I <sup>1</sup>	1
PNGE 460	Petroleum and Natural Gas Engineering Design/Capstone II <sup>1</sup>	2
Subtotal		57
<b>PNGE Electives (PNGE or EGEO)</b>		
Students must select two of the following courses, a minimum of six credits:		6
PNGE 330	Unconventional Reservoir Engineering <sup>1</sup>	
PNGE 443	Enhanced Oil Recovery <sup>1</sup>	
PNGE 445	Natural Gas Engineering with Lab <sup>1</sup>	
PNGE 470	Petroleum and Natural Gas Engineering Undergraduate Research <sup>1</sup>	
EGEO 358	Introduction to Geophysics/Lab <sup>1</sup>	
Subtotal		6
<b>Required Math and Science Courses</b>		
CHEM 108	General Chemistry II <sup>1</sup>	3
CHEM 112	General Chemistry II Lab <sup>1</sup>	1
EGEO 201	Earth Materials and Processes/Lab <sup>1</sup>	4
EGEO 327	Structural Geology <sup>1</sup>	4
MATH 232	Linear Algebra <sup>1</sup>	3

MATH 301	Differential Equations I <sup>1</sup>	3
STAT 350	Applied Statistics	3
Subtotal		21
<b>Total Hours</b>		<b>84</b>

<sup>1</sup> Course counts for 50% of Major requirements and Major GPA

<sup>2</sup> Course can be counted as a Rock Studies 2 Requirement, but earns credit only once toward your 120-credits total.

\* Some courses may require pre-requisites. Please see course descriptions to determine if there are any pre-requisites for that specific course.

### Natural Science and Math College-Wide Requirements

Code	Title	Hours
CHEM 107	General Chemistry I <sup>1</sup>	3
CHEM 111	General Chemistry I Lab <sup>1</sup>	1
MATH 225	Calculus I <sup>1</sup>	4
PHYS 216	University Physics 1 with Lab <sup>1</sup>	4
<b>Total Hours</b>		<b>12</b>

<sup>1</sup> Course can be counted as a Rock Studies 2 Requirement, but earns credit only once toward your 120-credits total.

### Important Curriculum Guide Notes

This Curriculum Guide is provided to help SRU students and prospective students better understand their intended major curriculum. Enrolled SRU students should note that the My Rock Audit may place already-earned and/or in progress courses in different, yet valid, curriculum categories. Enrolled SRU students should use the My Rock Audit Report and materials and information provided by their faculty advisers to ensure accurate progress towards degree completion. *The information on this guide is current as of the date listed. Students are responsible for curriculum requirements at the time of enrollment at the University.*

PASSHE - Pennsylvania State System of Higher Education Institutions

PETROLEUM AND NATURAL GAS ENGINEERING - BS (6180)

This program is effective as of Summer 2021

Revised 3.31.2022

UCC 10.26.2021

## Recommended Four-Year Plan

Course	Title	Hours
<b>First Year</b>		
<b>Fall</b>		
ENGR 110	Introduction to Engineering	2
CHEM 107 & CHEM 111	General Chemistry I and General Chemistry I Lab	4
ENGL 102	Critical Writing	3
ESAP 101	FIRST Seminar *	0-1
MATH 225	Calculus I	4
SUBJ 139	Foundations of Academic Discovery <sup>1</sup>	3
<b>Hours</b>		<b>16-17</b>
<b>Spring</b>		
ENGR 120	Engineering Design Tools	2
ENGL 104	Critical Reading	3

CHEM 108 & CHEM 112	General Chemistry II and General Chemistry II Lab	4
MATH 230	Calculus II	4
PHYS 216	University Physics 1 with Lab	4
<b>Hours</b>		<b>17</b>

**Second Year**
**Fall**

PNGE 201	Introduction to Petroleum and Natural Gas Engineering	1
ENGR 130	Engineering Computing Tools	2
ENGR 210	Statics	3
MATH 301	Differential Equations I	3
PHYS 217	University Physics 2 with Lab	4
Humanities Inquiry ( <a href="https://catalog.sru.edu/undergraduate/rock-studies/rock-studies-program/">https://catalog.sru.edu/undergraduate/rock-studies/rock-studies-program/</a> )		3
<b>Hours</b>		<b>16</b>

**Spring**

PNGE 312	Petrophysics	4
ENGR 230	Mechanics of Materials	3
EGEO 201	Earth Materials and Processes/Lab	4
MATH 232	Linear Algebra	3
Select one of the following:		3
COMM 200	Civil Discourse: Theory & Practice	
PHIL 110	Ethics and Civil Discourse	
POLS 235	Civil Discourse and Democracy	
<b>Hours</b>		<b>17</b>

**Third Year**
**Fall**

PNGE 315	Reservoir Fluids	3
PNGE 410	Drilling engineering with Lab	4
ENGR 301	Fluid Mechanics	3
ENGR 320	Thermodynamics	3
EGEO 327	Structural Geology	4
<b>Hours</b>		<b>17</b>

**Spring**

PNGE 325	Reservoir Engineering	3
PNGE 432	Formation Evaluation	3
PNGE Elective		3
STAT 350	Applied Statistics	3
Social Science Inquiry ( <a href="https://catalog.sru.edu/undergraduate/rock-studies/rock-studies-program/">https://catalog.sru.edu/undergraduate/rock-studies/rock-studies-program/</a> )		3
<b>Hours</b>		<b>15</b>

**Fourth Year**
**Fall**

PNGE 420	Production Engineering	3
PNGE 430	Reservoir Simulation	3
PNGE 440	Hydraulic Fracturing	3
PNGE 441	Oil and Natural Gas Resource Valuation and Economics	3
PNGE 459	Petroleum and Natural Gas Design/ Capstone I	1
ENGR 340	Engineering Economics	3
<b>Hours</b>		<b>16</b>

**Spring**

PNGE 435	Pressure Transient Analysis	3
PNGE 460	Petroleum and Natural Gas Engineering Design/Capstone II	2
PNGE Elective <sup>1</sup>		3
Creative & Aesthetic Inquiry ( <a href="https://catalog.sru.edu/undergraduate/rock-studies/rock-studies-program/">https://catalog.sru.edu/undergraduate/rock-studies/rock-studies-program/</a> )		3
Free Elective		3
<b>Hours</b>		<b>14</b>
<b>Total Hours**</b>		<b>128</b>

<sup>1</sup> Course offered in multiple subjects; cannot take course in first major subject.

\* Students are encouraged to take ESAP 101 as a Free Elective.

\*\*Select PNGE Elective from: PNGE 470, EGEO 358, PNGE 445, or PNGE 330.

*\*\* This document is meant to serve as a guide. Some planners may show more than 120 credits because faculty have created flexibility in choosing courses. However, only 120 credits are required to obtain a degree. Please consult with your academic adviser and refer to your curriculum guide prior to registering for courses. This plan should be reviewed, and verified, by you and your academic adviser at least once each academic year.*

Major Code: 6180

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