

# PETROLEUM AND NATURAL GAS ENGINEERING, B.S.

**Begin Campus:** Any Penn State Campus

**End Campus:** University Park

## Degree Requirements

For the Bachelor of Science degree in Petroleum and Natural Gas Engineering, a minimum of 129 credits is required:

Requirement	Credits
General Education	45
Requirements for the Major	114

30 of the 45 credits for General Education are included in the Requirements for the Major. This includes: 3 credits of GH courses; 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GS courses; 9 credits of GWS courses.

### General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (<https://bulletins.psu.edu/undergraduate/general-education/baccalaureate-degree-general-education-program/>) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

### Foundations (grade of C or better is required.)

- **Quantification (GQ):** 6 credits
- **Writing and Speaking (GWS):** 9 credits

### Knowledge Domains

- **Arts (GA):** 6 credits
- **Health and Wellness (GHW):** 3 credits
- **Humanities (GH):** 6 credits
- **Social and Behavioral Sciences (GS):** 6 credits
- **Natural Sciences (GN):** 9 credits

### Integrative Studies (may also complete a Knowledge Domain requirement)

- **Inter-Domain or Approved Linked Courses:** 6 credits

## University Degree Requirements

### First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

### Cultures Requirement

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

### Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

### Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

### Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

### Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (<http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80>)). For more information, check the Suggested Academic Plan for your intended program.

### Requirements for the Major

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (<http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44>).

Code	Title	Credits
<b>Prescribed Courses</b>		
CHEM 111	Experimental Chemistry I	1
ECON 102	Introductory Microeconomic Analysis and Policy	3
EMCH 210	Statics and Strength of Materials <sup>2</sup>	5
EMCH 212	Dynamics	3
EME 460	Geo-resource Evaluation and Investment Analysis	3
EMSC 100S	Earth and Mineral Sciences First-Year Seminar <sup>1</sup>	3
ENGL 202C	Effective Writing: Technical Writing	3
GEOSC 1	Physical Geology	3
GEOSC 454	Geology of Oil and Gas	3
MATH 220	Matrices	2
MATH 231	Calculus of Several Variables	2
MATH 251	Ordinary and Partial Differential Equations	4
PNG 301	Introduction to Petroleum and Natural Gas Engineering	3

PNG 420	Applied Reservoir Analysis and Secondary Recovery	3
PNG 425	Principles of Well Testing and Evaluation	3
PNG 430	Reservoir Modeling	3
PNG 440W	Formation Evaluation	3
PNG 480	Surface Production Engineering	3
PNG 482	Production Engineering Laboratory	1
PNG 490	Introduction to Petroleum Engineering Design	1
PNG 491	Capstone Design in Drilling and Completions	1
PNG 492	Petroleum Engineering Capstone Design	1
<i>Prescribed Courses: Require a grade of C or better</i>		
CHEM 110	Chemical Principles I	3
CHEM 112	Chemical Principles II	3
EME 301	Thermodynamics in Energy and Mineral Engineering	3
EME 303	Fluid Mechanics in Energy and Mineral Engineering	3
MATH 140	Calculus With Analytic Geometry I	4
MATH 141	Calculus with Analytic Geometry II	4
PHYS 211	General Physics: Mechanics	4
PHYS 212	General Physics: Electricity and Magnetism	4
PNG 405	Rock and Fluid Properties	3
PNG 406	Rock and Fluid Laboratory	1
PNG 410	Applied Reservoir Engineering	3
PNG 450	Drilling Engineering	3
PNG 451	Drilling Laboratory	1
PNG 475	Production and Completions Engineering	3

**Additional Courses**

Select 9 credits: one course from categories A, B, and C: 9

A.

ENGL 15 Rhetoric and Composition  
or ENGL 30H Honors Rhetoric and Composition

B.

PHIL 103 Ethics

PHIL 106 Business Ethics

PHIL 107 Philosophy of Technology

PHIL 233

C.

CMPSC 201 Programming for Engineers with C++  
or CMPSC 202

**Supporting Courses and Related Areas**

Select 6 credits in consultation with adviser (students may apply 6 credits of ROTC) 6

<sup>1</sup> The following substitutions are allowed for students attending campuses where the indicated course is not offered: CAS 100 can be substituted for EMSC 100S.

<sup>2</sup> Students at commonwealth campuses and/or transfer students can substitute the combination of EMCH 211 and EMCH 213.