

Department of Petroleum and Natural Gas Engineering

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Degree Offered

Bachelor of Science in Petroleum and Natural Gas Engineering

Curriculum in Petroleum and Natural Gas Engineering

Petroleum and natural gas engineering is concerned with design and application aspects of the discovery, production, and transportation of oil and natural gas resources. Professionals in this field must have a thorough understanding of the geological principles relating to the occurrence, discovery, and production of fluid hydrocarbons. The petroleum and natural gas engineer must know and be capable of applying both conventional engineering design principles as well as those pertaining specifically to the field of petroleum and natural gas engineering. These are developed in the petroleum engineering courses in the curriculum. In addition, a strong foundation in mathematics and the sciences broadens the future engineer's professional capabilities. Because many engineers will be employed as supervisors or executives, managerial and social skills are also emphasized.

Students are offered the opportunity to enter all phases of the petroleum and natural gas industry in meaningful and important jobs, continue their education towards advanced degrees, or in some cases pursue a combination of professional employment and continued education.

The petroleum and natural gas engineering undergraduate program educational objectives are to:

- The graduates will be successful in their professional careers as petroleum engineers in the energy industry, government agencies, and/or post-graduate education.
- The graduates will be successful in effectively formulating, communicating, and implementing solutions to engineering problems in a variety of professional environments.
- The graduates will be successful in demonstrating their obligations to the profession, to their employer, and to society.

The foundation for achieving program objectives is established through a rigorous curriculum that provides the students with:

- An understanding of scientific and engineering principles and the application of these principles in solving petroleum and natural gas engineering problems using modern tools.
- An integrated design experience leading to a capstone design course.
- A balanced and rounded education to recognize the need for developing technical communication and teamwork skills, as well as understanding the engineer's professional, ethical, and societal obligations.

The outcomes of the petroleum and natural gas engineering undergraduate program are as follows:

- The graduate will have a thorough understanding of scientific and engineering principles and their application to petroleum and natural gas engineering problems.
- The graduates will have the ability to integrate their scientific and engineering knowledge to design and conduct experiment, and interpret and analyze data.
- The graduates will have the ability to apply scientific and engineering fundamentals to formulate solutions to petroleum and natural gas engineering problems.
- The graduates will have the ability to use techniques, skills, and modern petroleum and natural gas engineering tools.
- The graduate will have the ability to integrate their scientific and engineering knowledge to solve petroleum and natural gas engineering design problems.
- The graduates will have the ability to communicate effectively.
- The graduates will have the ability to function on multi-disciplinary teams.
- The graduates will have recognition of petroleum engineer's responsibility in professional and ethical context.

- The graduate will have an understanding of the impact of petroleum and natural gas engineering solutions in societal and global context.
- The graduates will recognize the need to acquire the knowledge of contemporary issues.
- The graduate will recognize the need to engage in life-long learning.

These outcomes are achieved by enrolling in rigorous individual courses in all basic areas of petroleum and natural gas engineering, basic science, mathematics, geology, and humanities and social sciences. The petroleum and natural gas engineering curriculum also contains significant laboratory components aimed at reinforcing the knowledge gained in the classroom. In the senior year, electives are offered in which the student may obtain additional depth of knowledge in specific areas of petroleum and natural gas technology. Each student is individually assisted in course selection by an advisor who is a member of the petroleum and natural gas engineering faculty.

Students gain practical experience and first-hand knowledge of many aspects of petroleum and natural gas engineering through close proximity to the industry in West Virginia and surrounding states. Production sites, secondary and enhanced oil recovery projects, compressor stations, gas storage fields, and corporate offices all provide excellent opportunities for study. Additional experience is provided through modern, well-equipped laboratories within the department and the University. Students are urged to gain field experience through summer employment in the industry.

A student admitted to the program must achieve a grade point average of 2.25 or better and a grade of C or better in all petroleum and natural gas engineering (PNGE) courses in order to qualify for a bachelor's degree.

Petroleum and Natural Gas Engineering

First Year

Common first year as listed on the *middle* of page 102.

Second Year

First Semester	Hrs.	Second Semester	Hrs.
PHYS 112 <i>General Physics</i>	4	MATH 261 <i>Elem. Differential Equat...</i>	4
MATH 251 <i>Multivariable Calculus</i>	4	MAE 243 <i>Mech. of Materials</i>	3
MAE 241 <i>Statics</i>	3	MAE 331 <i>Fluid Mech.</i>	3
ENGL 102 <i>Composition & Rhetoric</i> ..	3	IENG 213 or STAT 215	3
GEOL 101 <i>Physical Geology</i>	3	PNGE 200 <i>Intro. Pet. Engr.</i>	3
Total	17	Total	16

Third Year

First Semester	Hrs.	Second Semester	Hrs.
PNGE 332 <i>Pet. Prop./Phase Beh.</i>	3	PNGE 310 <i>Drilling Engr.</i>	4
EE 221 <i>Basic Elec. Engr.</i>	3	PNGE 312 <i>Drilling Fl. Lab</i>	1
ECON 201 <i>Microeconomics</i>	3	PNGE 333 <i>Elem. Res. Engr.</i>	3
GEOL 342 <i>Struct. Geol.</i>	3	GEOL Elective*	3
MAE 320 <i>Thermodynamics</i>	3	ECON 202 <i>Macroeconomics</i>	3
Total	15	GEC Elective	3
		Total	17

Fourth Year

First Semester	Hrs.	Second Semester	Hrs.
PNGE 420 <i>Production Engr.</i>	3	PNGE 400 <i>Pet. Engr. Ethics</i>	1
PNGE 434 <i>App. Res. Engr.</i>	3	PNGE 405 <i>Multidis. Team Project</i>	1
PNGE 441 <i>O&G Property Eval.</i>	3	PNGE 432 <i>Pet. Res. Lab</i>	1
PNGE 450 <i>Formation Eval.</i>	3	PNGE 480 <i>Pet. Engr. Design</i>	3
PNGE 470 <i>Nat. Gas. Engr.</i>	4	Technical Elective**	3
Total	16	GEC Elective	6
		Total	15
		Grand Total	131

*Recommended geology electives are GEOL 365, 454, or 472.

**Recommended technical electives are PNGE 460, 471, 501, or 532.