

# Petroleum Engineering

A petroleum engineer is involved in drilling oil and gas wells, sustaining oil and gas production from completed wells, estimating reserves and planning new development. Because of the demand for oil and gas and advances in petroleum related technologies, the field of petroleum engineering continues to play a vital role in the world's energy future.

As a petroleum engineering student, you will study techniques for evaluating the characteristics of petroleum-bearing formations, their fluid contents, and inflow capability. You will study the technologies of oil and gas drilling, production, reserves estimation, and production forecasting. You will learn about a wide range of hydrocarbon resources, including oil reservoirs, gas reservoirs, tar sands, and unconventional shale resources which are providing an increasing share of today's clean natural gas.

Most importantly, you will learn methods of economically developing these resources. You will also learn about CO<sub>2</sub> sequestration and natural gas storage.

Missouri S&T's petroleum engineering program is one of sixteen programs in the United States and it's the only one where students take a rich sequence of geosciences courses fully integrated within the petroleum engineering curriculum. As a result, petroleum engineering graduates from Missouri S&T are well equipped to work with a wide range of professionals to solve multidisciplinary development problems.

The petroleum engineering program is also unique because the program emphasizes the importance of integrating all subsurface information into a single self-consistent whole through an emphasis on Mechanical Earth Modeling (MEM). MEM uses a wide range of data to build state-of-stress subsurface models which are important to all oil and gas technical disciplines since they help to maximize recovery and oil or gas revenue through improved drilling and development practices.

## Student Organizations and Undergraduate Research

Undergraduate research opportunities are available through the OURE program as well as many faculty-sponsored projects. Petroleum engineering faculty works with faculty members from several other disciplines on many interdisciplinary engineering research projects.

There is a student chapter of the Society of Petroleum Engineers that meets monthly and the national petroleum engineering honorary society, Pi Epsilon Tau.

## Top Hiring Employers

Chevron	ExxonMobil
Chesapeake Energy	ConocoPhillips
Southwestern Energy	Newfield
Williams Companies	Kinder Morgan
Schlumberger	Halliburton

## Scholarship Information

Freshman scholarships are awarded based on high school transcripts and ACT/SAT scores. Some may require a separate application. Scholarships ranging from \$1,000 to \$3,000 for sophomores, juniors and seniors typically require an application and are based on academic record, service activities and extracurricular activities.

## Co-op and Internship Availability

Co-op and summer intern programs are available to students. These programs provide students with the opportunity to integrate their classroom studies with learning through productive work experiences in a field related to a student's academic or career goals. Work for a semester or during the summer and build your resume.

## Departmental Contact Information:

Department Chair:	Dr. Ralph Flori
Program Head:	Dr. Shari Dunn-Norman
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<a href="mailto:gse.mst.edu">gse.mst.edu</a>	<a href="mailto:rocks@mst.edu">rocks@mst.edu</a>

## Faculty

### Professors:

Mohamed Abdelsalam, Ph.D., Texas-Dallas  
 Neil Anderson<sup>1,2</sup>, Ph.D., Calgary  
 Jeffrey Cawfield<sup>1,2</sup>, Ph.D., California-Berkeley  
 Curt Elmore<sup>1</sup>, Ph.D., Arizona  
 Stephen Gao, Ph.D., UCLA  
 Leonard Koederitz<sup>1</sup> (Curators'), Ph.D., Missouri S&T  
 Kelly Lui, Ph.D., UCLA  
 Francisca Oboh-Ikuenobe, Ph.D., Cambridge (Program Head)

### Associate Professors:

Baijun Bai, Ph.D., China Univ of Geosciences  
 Shari Dunn-Norman, Ph.D., Heriot-Watt (Program Head)  
 Ralph Flori, Ph.D., Missouri S&T (Chair)  
 Leslie Gertsch, Ph.D., Colorado School of Mines  
 John P. Hogan, Ph.D., Virginia Tech  
 Norbert Maerz<sup>1</sup>, Ph.D., Waterloo (Program Head)  
 J. David Rogers<sup>1,2</sup>, Ph.D., California-Berkeley  
 David Wronkiewicz, Ph.D., New Mexico Tech  
 Wan Yang, Ph.D., Texas

### Assistant Professors:

Ahadab Anwar, Ph.D., Florida International  
 Runar Nygaard, Ph.D., Oslo  
 Andreas Eckert, Ph.D., Karlsruhe

Registered Professional Engineer  
 Registered Geologist

## Related Programs and Minors

In addition to a Bachelor of Science in Petroleum Engineering, Missouri S&T offers the following related degree programs. Requirements are outlined in Missouri S&T's course catalog, available online at [registrar.mst.edu](http://registrar.mst.edu).

- Bachelor of Science, Geological Engineering
- Bachelor of Science, Geology and Geophysics
- Bachelor of Science, Chemical Engineering
- Minor, Petroleum Engineering

## Mechanical Earth Modeling (MEM): An S&T Exclusive

Petroleum engineering students may choose several technical electives to deepen their experience in the traditional petroleum areas of drilling, production and reservoir engineering. All students take a rich sequence of classes in geology, geophysics, rock mechanics, finite element analysis, and MEM that equip them to see the big picture of the state of stress in the reservoir and to use this information in drilling, fracturing, development and modeling decisions.

## Notes

Detailed information on course equivalencies, acceptable credits for elective coursework, grade requirements and prerequisites is available from S&T's Registrar's Office at [registrar.mst.edu](http://registrar.mst.edu).

All Petroleum Engineering students must take the Fundamentals of Engineering Examination prior to graduation. A passing grade is not required; however, this is the first step to becoming a registered professional engineer.

## Bachelor of Science

Petroleum Engineering ..... 129 credit hours

Entering freshmen desiring to study petroleum engineering are admitted to the Freshman Engineering Program. They will, however, state a Petroleum Engineering preference, which will be used as a consideration for available freshman departmental scholarships. The focus of the Freshmen Engineering program is on enhanced advising and career counseling, with the goal of providing to the student the information necessary to make an informed decision.

### FIRST YEAR

	Credit
FE 1100-Careers in Engineering.....	1
PetE 1110-Intro to Oil Well Drilling.....	1
MechE 1720-Intro to Engineering Design.....	3
Chemistry 1310, 1319-General Chemistry w/ Lab.....	5
English 1120-Exposition.....	3
Math 1214-Calculus for Engineering I.....	4
Math 1215-Calculus for Engineering II.....	4
Physics 1135-Engineering Physics I.....	4
History 1200, 1300, 1310, or Political Science 1200.....	3
GeoE 1150 or Geo 1110-Geology for Engineers.....	3
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### SECOND YEAR

Geology 3310-Structural Geology.....	4
Geology 3620-Stratigraphy and Sedimentation.....	3
MechE 2350-Engr Mech/Dynamics.....	2
CivE 2200-Engr Mech/Statics.....	3
Math 3304-Differential Equations.....	3
Math 2222-Calculus III w/ Analytic Geometry.....	4
CivE 2210-Mechanics of Materials.....	3
PetE 2510-Fluid Petroleum Properties.....	3
PetE 3520 & 3529-Petro Reservoir Engr w/ Lab.....	4
Physics 2135-Engineering Physics II.....	4
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### THIRD YEAR

CivE 3330-Elem Fluid Mechanics.....	3
Geology 4511-Petroleum Geology.....	3
GeoPhys 4231-Seismic Interpretation (3D Seismic).....	3
MechE 2527-Thermal Analysis.....	3
PetE 3310-Well Logging.....	3
PetE 4410-Well Performance and Production.....	3
PetE 4210-Drilling and Well Design.....	3
PetE 4710-Finite Element Analysis in Pet Engr.....	4
PetE Reservoir Engineering Elective.....	3
Economics 1100 or 1200-Micro or Macroeconomics.....	3
Elective/Humanities or Social Science.....	3
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### FOURTH YEAR

English 1600-Technical Writing.....	3
GeoE 4115-Geostatistical Methods.....	3
PetE 4010-Ethics and Professionalism.....	1
PetE 4520-Well Testing.....	3
PetE 4097-Petroleum Engineering Design.....	3
PetE 4590-Petroleum Econ and Asset Valuation.....	3
PetE 4720-Mechanical Earth Modeling.....	3
PetE Elective.....	3
PetE Elective.....	3
Elective/Humanities or Social Science.....	3
Elective/ Humanities or Social Science.....	3
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