



CULLEN COLLEGE OF ENGINEERING
OFFICE OF THE DEAN

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March 4, 2008

APPROVED MAY 14 2008

NEEDS CB APPROVAL

MEMORANDUM

EFFECTIVE: FALL 2009

TO: UH Undergraduate Council
FROM: Joseph W. Tedesco 
SUBJECT: New Program Request for B.S. in Petroleum Engineering

With the support of the Provost, we have recently launched an intensive effort to strengthen our petroleum engineering program. We are currently searching for three new faculty in PeTR and hope to have them on board during the upcoming year.

An integral component of our academic program enhancement is the establishment of a Bachelor of Science degree in Petroleum Engineering that will complement our already viable graduate program. The attached *New Program Request for a Bachelor of Science in Petroleum Engineering* is submitted with the recommendation of the College Undergraduate Curriculum Committee, as well as the Associate Dean for Undergraduate Programs. In submitting the proposal, I offer my personal endorsement and approval.

We appreciate favorable consideration by the Undergraduate Council and ask that our proposal then be forwarded to the appropriate bodies for final approval.

Thank you.

JWT:kk
attachment



DEPARTMENT OF CHEMICAL AND BIOMOLECULAR ENGINEERING

RECEIVED JAN 24 2008

January 23, 2008

Undergraduate Counsel

Dear Counsel Members:

Please be advised that Kishore Mohanty has been named the Interim Director of the Petroleum Engineering Program.

Sincerely,

Dr. Michael P. Harold, Ph.D.
Chair, Department of Chemical Engineering

Directions: An institution shall use this form to propose a new bachelor's or master's degree program. In completing the form, the institution should refer to the document *Standards for Bachelor's and Master's Programs*, which prescribes specific requirements for new degree programs. Note: This form requires signatures of (1) the Chief Executive Officer, certifying adequacy of funding for the new program; (2) a member of the Board of Regents (or designee), certifying Board approval, and (3) if applicable, a member of the Board of Regents or (designee), certifying that criteria have been met for staff-level approval. Note: An institution which does not have preliminary authority for the proposed program shall submit a separate request for preliminary authority. That request shall address criteria set in Coordinating Board rules Section 5.24 (a).

Information: Contact the Division of Academic Affairs and Research at 512/427-6200 for more information.

Administrative Information

1. **Institution:** University of Houston, Cullen College of Engineering, Chemical and Biomolecular Engineering Department
2. **Program Name** – Show how the program would appear on the Coordinating Board's program inventory (e.g., *Bachelor of Business Administration degree with a major in Accounting*):
Bachelor of Science in Petroleum Engineering
3. **Proposed CIP Code:** 14.2501.00 06
4. **Brief Program Description** – Describe the program and the educational objectives:
Main objective of Integrated Petroleum Engineering is to train students in petroleum engineering as well as sufficient knowledge of another complementary engineering discipline to allow their participation in development and utilization of the complex technologies that will be required and used in exploration and production of hydrocarbon reservoirs in the coming decades.
5. **Administrative Unit** – Identify where the program would fit within the organizational structure of the university (e.g., *The Department of Electrical Engineering within the College of Engineering*): Department of Chemical and Biomolecular Engineering within the Cullen College of Engineering. Depending on program size and size of student enrollment, Petroleum Engineering may qualify to become a separate department in the future.
6. **Proposed Implementation Date** – Report the first semester and year that students would enter the program: August 2008. ?
7. **Contact Person** – Provide contact information for the person who can answer specific questions about the program:

Name: Dr. Michael Harold

Title: Chair, Department of Chemical and Biomolecular Engineering

E-mail: mharold@uh.edu

Phone: 713 743 4307

Program Information

I. Need

Note: Complete I.A and I.B only if preliminary authority for the program was granted more than four years ago. This includes programs for which the institution was granted broad preliminary authority for the discipline.

- A. Job Market Need – Provide short- and long-term evidence of the need for graduates in the job market.

There is a severe shortage of petroleum professionals in the oil and gas industry. The need is global and the subject of many industry-wide articles, forums and discussions. Economic development efforts at the state and local level have clearly identified the training of petroleum engineers as a critical need to maintain the state's economic growth. Because of the rapid expansion of the industry, it is anticipated that man-power needs of the industry will grow by 30% within the next fifteen years. When added to the other 50% of present staff who will retire or leave the industry during the same period, the consensus among human resources experts is that the present shortage will continue for at least the next fifteen years. It should be noted that the shortage in the oil and gas industry is rapidly spilling over to other engineering disciplines because; 1) oil and gas industry is hiring other disciplines to satisfy the shortage 2) other industries are also experiencing rapid growth as they try to support oil and gas.

- B. Student Demand – Provide short- and long-term evidence of demand for the program.

UH is currently receiving a large number of requests from prospective students and inquiries about when the undergraduate program will start. In addition, there is a sudden surge in demand from students in other departments to receive a minor in Petroleum Engineering (this request is gradually being implemented within Cullen College of Engineering). Our location in Houston, the global energy capital, will continue to keep Petroleum Engineering in the headlines.

- C. Enrollment Projections – Use this table to show the estimated cumulative headcount and full-time student equivalent (FTSE) enrollment for the first five years of the program. (Include majors only and consider attrition and graduation.)

YEAR	1	2	3	4	5
Headcount	50	125	175	225	250
FTSE	40	100	135	170	200

II. Quality

- A. Degree Requirements – Use this table to show the degree requirements of the program. (Modify the table as needed; if necessary, replicate the table for more than one option.)

Category	Semester Credit Hours		Clock Hours	
	Module 2	Module 3		
General Education Core Curriculum (bachelor's degree only)	42	42	1764	1764
Required Courses	65	65	2730	2730
Prescribed Electives	18	21	756	882
Free Electives	9	9	378	378
Other (Specify, e.g., internships, clinical work)	(if not included above)			
TOTAL	134	137 40	5628	5754

- B. Curriculum – Use these tables to identify the required courses and prescribed electives of the program. Note with an asterisk (*) core courses that would be added if the program is approved. (Add and delete rows as needed. If applicable, replicate the tables for different tracks/options.)

Prefix and Number	Required Courses	SCH
CHEE 1331	Computing for Engineers	3
CHEM 1117	Fundamentals of Chemistry Lab**	1

CHEM 1372	Fundamentals of Chemistry for Engineers**	3
CIVE 3334	Fluid Mechanics & Hydraulics Engineering*	3
ENGI 2304	Technical Communication	3
ENGI 4397	Engineering Leadership & Entrepreneurism Program	3
ENGL 1303	Freshman Composition I	3
ENGL 1304	Freshman Composition II	3
GEOL 1330	Physical Geology	3
HIST 1377	US History to 1877	3
HIST 1378	US History Since 1877	3
INDE 2333	Engineering Statistics	3
MATH 1431	Calculus I	4
MATH 1432	Calculus II	4
MATH 2433	Calculus III	4
MATH 3321	Engineering Mathematics	3
MECE 2334	Thermodynamics I	3
MECE 3400	Introduction to Mechanics	4
PETR 1111	Introduction to Hydrocarbon Resources*	1
PETR 2311	Reservoir Petrophysics*	3
PETR 3211	Petroleum Engineering Lab*	2
PETR 3313	Reservoir Fluids*	3
PETR 3315	Introduction to Well Logging*	3
PETR 3318	Well Drilling & Completion I*	3
PETR 3321	Pressure Transient Testing*	3
PETR 3362	Reservoir Engineering I*	3
PETR 5300	Data Mining & Database Management*	3
PETR 5311	Creativity & Innovation*	3
PETR 5392	Project Management*	3
PHYS 1321	Physics I	3
PHYS 1322	University Physics II	3
POLS 1336	US and Texas Constitutions and Politics	3
POLS 1337	US Government	3
	Humanities Core	3
	Visual and Performing Arts Core	3
	Social & Behavioral Science	3

** Students taking PETR Option 3 should replace with CHEM 1331 and CHEM 1112. *1111*

*** Students taking PETR Option 3 will be required to take an additional three course credit hours. Students taking this option will complete 137 course credit hours in obtaining a degree.

Prefix and Number	Prescribed Elective Courses	SCH
	PETR Module 1*	9
	PETR Module 2*	9
	PETR Module 3**	12***
	PETR Elective 1	3
	PETR Elective 2	3
	PETR Elective 3	3

C. Faculty – Use these tables to provide information about Core and Support faculty. Add an asterisk (*) before the name of the individual who will have direct administrative responsibilities for the program. (Add and delete rows as needed.)

Name of Core Faculty and Faculty Rank	Highest Degree and Awarding Institution	Courses Assigned in Program	% Time Assigned To Program
New Faculty in Year 1	PhD in Petroleum or equivalent Engineering	PETR 2311, PETR 3211, PETR 3313	50%
New Faculty in Year 1 Tenure-Track	PhD in Petroleum or equivalent Engineering	PETR 3315	17%

Dr. Robello Samuel, Adjunct Prof.	PhD in Petroleum Engineering University of Tulsa	PETR 3318	17%
Dr. Jeff App, Adjunct Prof.	PhD in Chemical Engineering University of Houston	PETR 3321	17%
Dr. Larry Brown, Adjunct Prof.	PhD in Engineering Science University of Tulsa	PETR 3362	17%
Dr. Ali Daneshy, Adjunct Prof.	PhD in Mining Engineering University of Missouri	PETR 5311	17%
Dr. Kishore Mohanty*, Professor and Interim Director	Ph.D. in Chemical Engineering University of Minnesota	PETR 5302	17%
New Faculty in Year 2	PhD in Petroleum or equivalent Engineering	PETR 5325	17%
New Faculty in Year 2	PhD in Petroleum or equivalent Engineering	PETR 5324	17%

As can be seen above, the Petroleum Engineering curriculum has been built heavily around use of existing courses at Cullen College of Engineering. The curriculum includes the following 3000 level course or above from other departments:

Chemical & Biomolecular Engineering	1 course
Civil Engineering	4 courses
Electrical Engineering	1 course
General Engineering	1 course
Industrial Engineering	1 course
Mathematics	1 course
Mechanical Engineering	2 courses
Chemistry	1 course
Mechanical Technology	1 course

The selection of PETR elective courses is based on their application in the oil and gas industry, with particular emphasis on the future direction of technology in the Petroleum Engineering discipline. Faculty teaching

these courses are very likely to also be collaborating with Petroleum Engineering faculty in research and development work.

Name of Support Faculty and Faculty Rank	Highest Degree and Awarding Institution	Courses Assigned in Program	% Time Assigned To Program
Dr. Jagganatha Rao Assoc. Professor	PhD Mechanical Engineering University of Michigan	MECE 3360	17%
Dr. L. Schulze Assoc. Professor	PhD in Industrial Engineering Texas A&M University	INDE 3333	17%
Dr. K. Han Retired Research Active	D.Sc. Civil Engineering Washington University	CIVE 3337	17%
Dr. W. Wozik Assoc. Professor	PhD in Electrical Engineering Warsaw Univ. of Technology	ECE 3336	17%

- D. Library – Provide the library director's assessment of library resources necessary for the program. Describe plans to build the library holdings to support the program.

All students enrolled in this program will have physical and remote access to the UH M.D. Anderson Library's collection. This includes access to the standard catalog of holdings as well as the university's searchable databases, including Statistical Universe, Academic Universe, the Reader's Guide, Applied Science and Technology, National Academy Press Online, NetLibrary, and over 150 other databases. Complete information about library services may be found on the UH Library website (<http://info.lib.uh.edu/index.html>).

In addition to common library sources for all students, Petroleum Engineering students enjoy special benefits provided to them by the industry. These include;

- I. Free membership in Society of Petroleum Engineers. This membership gives them free access to *Journal of Petroleum Engineering*, which is the flagship publication of the industry.
- II. Free access to SPE e-library. This electronic library is the dominant source of technical information in the oil and gas industry.
- III. Free access to publications of other sister disciplines such as geology, geophysics, etc. through the SPE e-library.

- E. Facilities and Equipment – Describe the availability and adequacy of facilities and equipment to support the program. Describe plans for facility and equipment improvements/additions.

Aside from use of existing support laboratories (such as chemical engineering, physics, chemistry, etc), UH is working with industry to enhance its capacity to support undergraduate research and lab activities. The following have been identified as primary goals for our first phase of program expansion:

- I. Petroleum fluids lab
- II. General petroleum lab
- III. Drilling and completion lab

Another component of experimental work will be centers of excellence which are planned as part of the overall program. These will be built primarily with the support of industry and as part of the research work that will be conducted within the Petroleum Engineering discipline.

One of the objectives of Petroleum Engineering is to promote and facilitate close collaboration with other departments within UH, and with the industrial community in the Houston metropolitan area. Establishment of new laboratories will be a by-product of this collaboration.

- F. Accreditation – If the discipline has a national accrediting body, describe plans to obtain accreditation or provide a rationale for not pursuing accreditation.

The program management will adhere to requirements of ABET, the accrediting body of the Engineering discipline. We will follow procedures developed by the Dept. of Chemical and Biomolecular Engineering in meeting the ABET criteria. Particular attention will be placed on ABET Criterion 2 (Program Educational Objectives, PEOs) and 3 (Program Outcomes Assessment), which in recent years have attracted scrutiny by ABET. More specifically, we will develop PEOs by engaging the various PETR constituencies and track the program performance in meeting the PEOs through a disciplined process. Similarly, we will follow the processes put in place by CHBE for ensuring that PETR graduates meet established program outcomes.

The curriculum was designed with several unique components based on the input from energy companies as well as recently graduated engineers from other universities. This process mirrors the one we will employ in evaluating the effectiveness of the curriculum in meeting the Program Educational Objectives. The curriculum contains the required content specified by ABET; specifically:

- mathematics through differential equations, probability and statistics, fluid mechanics, strength of materials, and thermodynamics;
- design and analysis of well systems and procedures for drilling and completing wells;
- characterization and evaluation of subsurface geological formations and their resources using geoscientific and engineering methods;
- design and analysis of systems for producing, injecting, and handling fluids; application of reservoir engineering principles and practices for optimizing resource development and management;
- use of project economics and resource valuation methods for design and decision making under conditions of risk and uncertainty.

These components are all covered in the required courses.

III. Costs and Funding

Five-Year Costs and Funding Sources - Use this table to show five-year costs and sources of funding for the program.

Five-Year Costs		Five-Year Funding	
Personnel ¹	\$5,345,000	Reallocated Funds	\$3,636,812
Facilities and Equipment	\$1,200,000	Anticipated New Formula Funding ³	\$2,782,752
Library, Supplies, and Materials	\$247,500	Special Item Funding	\$0
Other ²	\$1,336,250	Other ⁴	\$1,709,186
Total Costs	\$8,128,750	Total Funding	\$4,491,938

1. Report costs for new faculty hires, graduate assistants, and technical support personnel. For new faculty, prorate individual salaries as a percentage of the time assigned to the program. If existing faculty will contribute to program, include costs necessary to maintain existing programs (e.g., cost of adjunct to cover courses previously taught by faculty who would teach in new program).
2. Specify other costs here (e.g., administrative costs, travel).
3. Indicate formula funding for students new to the institution because of the program; formula funding should be included only for years three through five of the program and should reflect enrollment projections for years three through five.
4. Report other sources of funding here. In-hand grants, "likely" future grants, and designated tuition and fees can be included.

Signature Page

1. Adequacy of Funding – The chief executive officer shall sign the following statement:

I certify that the institution has adequate funds to cover the costs of the new program. Furthermore, the new program will not reduce the effectiveness or quality of existing programs at the institution.

 Chief Executive Officer

 Date

2. Board of Regents or Designee Approval – A member of the Board of Regents or designee shall sign the following statement:

On behalf of the Board of Regents, I approve the program.

Board of Regents (Designee)

Date of Approval

3. Board of Regents Certification of Criteria for Commissioner of Assistant Commissioner Approval – For a program to be approved by the Commissioner or the Assistant Commissioner for Academic Affairs and Research, the Board of Regents or designee must certify that the new program meets the eight criteria under TAC Section 5.50 (b): The criteria stipulate that the program shall:

- (1) be within the institution's current Table of Programs;
- (2) have a curriculum, faculty, resources, support services, and other components of a degree program that are comparable to those of high quality programs in the same or similar disciplines at other institutions;
- (3) have sufficient clinical or in-service sites, if applicable, to support the program;
- (4) be consistent with the standards of the Commission of Colleges of the Southern Association of Colleges and Schools and, if applicable, with the standards or discipline-specific accrediting agencies and licensing agencies;
- (5) attract students on a long-term basis and produce graduates who would have opportunities for employment; or the program is appropriate for the development of a well-rounded array of basic baccalaureate degree programs at the institution;
- (6) not unnecessarily duplicate existing programs at other institutions;
- (7) not be dependent on future Special Item funding
- (8) have new five-year costs that would not exceed \$2 million.

On behalf of the Board of Regents, I certify that the new program meets the criteria specified under TAC Section 5.50 (b).

Board of Regents (Designee)

Date

Bachelor of Science in Petroleum Engineering (PETR)

Petroleum Engineering (hereinafter PETR) majors must earn a grade of C- or better in all engineering, mathematics, and science courses, including courses considered for transfer credit.

After attempting at least six hours within the major, if the cumulative major GPA is below 2.25, the student is placed on probation.

Once on probation, in the next semester(s), the semester GPA is evaluated. If the semester major GPA is greater than or equal to 2.25, but the cumulative GPA is below 2.25, the student continues on probation. If the semester major GPA is below 2.25 the student is suspended.

Hours in the major include all PETR courses plus MATH 3321, MECE 2334, CIVE 3334, CHEE 1331.

PETR – First Year

Fall Semester

ENGL 1303	Freshman Composition I	3
HIST 1377	US History to 1877	3
CHEM 1372	Fundamentals of Chemistry for Engineers*	3
CHEM 1117	Fundamentals of Chemistry Lab*	1
MATH 1431	Calculus I	4
GEOL 1330	Physical Geology	3
Total		17

Replace with CHEM 1331 and CHEM ~~1112~~ for students taking PETR Option 3

Spring Semester

CHEE 1331	Computing for Engineers	3
POLS 1336	US and Texas Constitutions and Politics	3
MATH 1432	Calculus II	4
PETR 1111	Introduction to Hydrocarbon Resources	1
PHYS 1321	Physics I	3
ENGL1304	Freshman Composition II	3
Total		17

PETR Second Year

Fall Semester

	Humanities Core	3
MATH 2433	Calculus III	4
PHYS 1322	University Physics II	3
	Visual and Performing Arts Core	3
INDE 2333	Engineering Statistics I	3
Total		16

Spring Semester

MATH 3321	Engineering Mathematics	3
MECE 2334	Thermodynamics I	3
	Social & Behavioral Science	3

PETR 2311	Reservoir Petrophysics	3
ENGI 2304	Technical Communication	3
HIST 1378	US History Since 1877	3

Total 18

PETR Third Year

Fall Semester

PETR 3211	Petroleum Engineering Lab	2
PETR 3321	Pressure Transient Testing	3
PETR 3313	Reservoir Fluids	3
PETR 3315	Introduction to Well Logging	3
MECE 3400	Introduction to Mechanics	4
PETR 3362	Reservoir Engineering I	3

Total 18

Spring Semester

PETR 3318	Well Drilling and Completion I	3
CIVE 3334	Fluid Mechanics & Hydraulics Engineering	3
	PETR Module 1: Course 1	3
	PETR Module 2/3: Course 1	3
	PETR Elective 1	3

POLS 1337	US Government	3
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Total 18

PETR Fourth Year

Fall Semester

	PETR Module 1: Course 2	3
PETR 5311	Creativity & Innovation	3
ENGI 4397	Engineering Leadership and Entrepreneurism Program	3
	PETR Module 2/3: Course 2	3
	PETR Elective 2	3

Total 15

Spring Semester

	PETR Module 1: Course 3	3
	PETR Elective 3	3
	PETR Module 2/3: Course 3	3
	PETR Module 3: Course 4	3
PETR 5300	Data Mining & Database Management	3
PETR 5392	Project Management	3

Total 15 (for Module 2)

18 (for Module 3)

Total for Degree

134 (for Module 2)

137 (for Module 3)

PETR students must take PETR Module 1 and either PETR Module 2 or 3 below. These options are as follows:

PETR Module 1: Reservoir Engineering

PETR 5302	Reservoir Engineering II (Prerequisites: PETR 3362, PETR 3313, PETR 2311)	3
PETR 5325	Integrated Reservoir Characterization (Prerequisites: PETR 2311, PETR 3313, PETR 3315)	3
PETR 5324	Theory of Reservoir Modeling (Prerequisites: MATH 3321, MECE 2334 and PETR 3313)	3
Total		9

PETR Module 2: Production Engineering

PETR 5372	Petroleum Production Operations I (Prerequisites: PETR 3318, PETR 2311, PETR 3313, PETR 3315)	3
PETR 5310	Petroleum Production Economics (Prerequisites: PETR 3362, PETR 3313, PETR 2311)	3
PETR 5350	Natural Gas Engineering (Prerequisites: PETR 3362, PETR 3313)	3
Total		9

PETR Module 3: Chemical Engineering

CHEM 1332	Fundamentals of Chemistry (prerequisite: MATH 1310)	3
CHEE 2331	Chemical Processes (prerequisites: CHEM 1331, CHEM 1332)	3
CHEM 3331	Fundamentals of Organic Chemistry (prerequisites: CHEM 1332)	3
CHEE 3300	Materials Science and Engineering I (prerequisites: CHEE 2331, CHEM 1332, PHYS 1321, and credit for or concurrent enrollment in MATH 3321)	3
Total		12

Each PETR student has to take at least nine (9) elective credits. Below is a listing of these elective courses. Students are expected to have completed the specific course prerequisites for their selected electives. (* denotes courses required within the curriculum)

CIVE 3331	Environmental Engineering (prerequisites for PETR students: CHEM 1117*, CHEM 1372*, MECE 2334*)	3
INDE 3333	Engineering Economy I (prerequisites: INDE 2333* or MECE 3360)	3
ECE 3336	Introduction to Circuits and Electronics (Prerequisites: MATH 2433* and PHYS 1322*)	3

from any one of the following groups

Elective Group 1

ECE 3336	Introduction to Circuits and Electronics (Prerequisites: MATH 2433*, and PHYS 1322*)	3
MECE 2336	Mechanics I (prerequisites: PHYS 1321* and credit for or concurrent enrollment in MATH 2433*).	3
MECE 3360	Experimental Methods (prerequisites: MECE 1331 (CHEE 1331*), ECE 3336, ENGI 2304*, MECE 2334* and MECE 2336)	3

Elective Group 2

CIVE 2330	Mechanics I (Statics) (prerequisites: PHYS 1321* and credit for or concurrent enrollment in CIVE 1331 (CHEE 1331*) and MATH 2433*)	3
CIVE 2332	Mechanics of Deformable Solids (prerequisites: CIVE 2330 and MATH 2433* and credit for or concurrent enrollment in MECT 3341)	3
MECT 3341	Computer Aided Drafting I (requires concurrent enrollment with CIVE 2332)	3

Elective Group 3 (Note: 12 credits)

CIVE 2330	Mechanics I (Statics) (prerequisites: PHYS 1321* and credit for or concurrent enrollment in CIVE 1331 (CHEE 1331*) and MATH 2433*)	3
CIVE 2332	Mechanics of Deformable Solids (prerequisites: CIVE 2330 and MATH 2433* and credit for or concurrent enrollment in MECT 3341)	3
MECT 3341	Computer Aided Drafting I (requires concurrent enrollment with CIVE 2332)	3
CIVE 3339	Geotechnical Engineering (prerequisites: CIVE 2332 and credit for or concurrent enrollment in MATH 3321*)	3

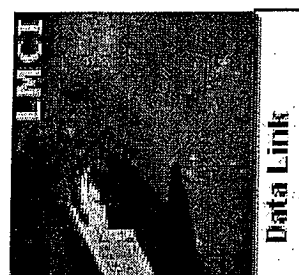
Elective Group 4 (Note: 12 credits)

CIVE 2330	Mechanics I (Statics) (prerequisites: PHYS 1321* and credit for or concurrent enrollment in CIVE 1331 (CHEE 1331*) and MATH 2433*)	3
CIVE 2332	Mechanics of Deformable Solids (prerequisites: CIVE 2330 and MATH 2433* and credit for or concurrent enrollment in MECT 3341)	3
MECT 3341	Computer Aided Drafting I (requires concurrent enrollment with CIVE 2332)	3
CIVE 3337	Theory of Structures (prerequisite: CIVE 2332)	3

**University of Houston
Petroleum Engineering Program
Corporate/Industrial Stakeholders**

The following corporations and industry leaders have expressed strong support for the University of Houston's efforts to begin an undergraduate degree in Petroleum Engineering:

ExxonMobil
Marathon Oil
Carl Glaw
Chevron
Halliburton
Devon Energy
Ali Daneshy
Reuven Hollo
Michael Economides
Aramco
FMC Technologies
Apache Corp.
BHP Petroleum
BJ Services
EOG Resources
Schlumberger
Broussard
Tsonga Offshore
Society of Petroleum Engineers



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Area	Code	Occupation	Est Yr-Proj Yr	Total Annual Openings
Texas	172171	Petroleum Engineers	2004 - 2014	420

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