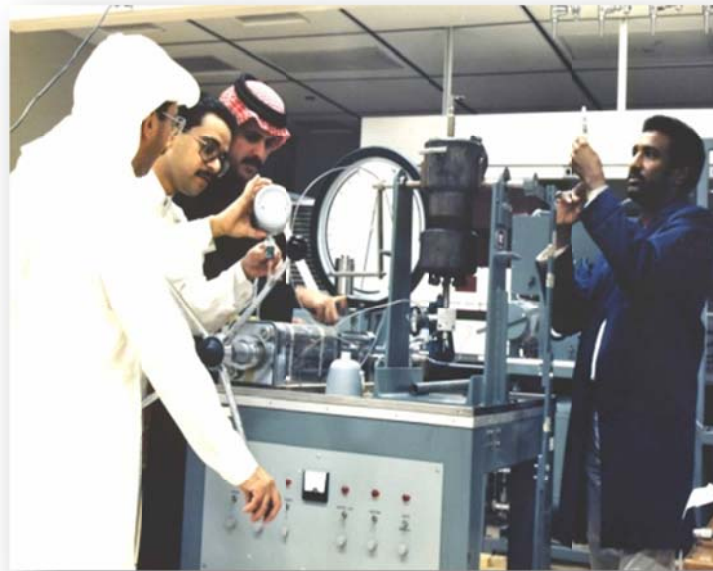




**King Saud University**  
**College of Engineering**  
**Petroleum and Natural Gas Engineering Department**  
**(PGED-KSU)**

**PGED Strategic Plan -I-**  
**(1436-1440 H - 2014-2020 G)**



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## PGED Strategic Plan -I- Committee

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## Forward

The external environment has a deep impact on educational institutions. During the last few decades, significant changes took place in almost every aspect of life including the economy, social structures and even in individual preferences. Existing educational programs and those planned for the future irrespective of the type of school, should be based on a careful consideration of future trends in society. Strategies must be developed to ensure that institutions will be responsible to the needs of the people at present and beyond. The College of Engineering and Petroleum and Natural Gas Engineering Department at King Saud University has recently carried out a series of surveys (e.g., employers, graduating senior students, alumni and faculty members) to obtain feedback of its constituents on some key issues related to its engineering programs, facilities, and policies. These survey results, available external evaluations and observations regarding local, regional, and international developments, are used to develop a detailed SWOT analysis for the Petroleum and Natural Gas Engineering Department (programs, students, faculty, facilities, and research).

# Introduction

The Department was established in 1973 to become the first Petroleum Engineering Department in the Kingdom and the GCC region. Its establishment was a national response to the increasing demand for petroleum engineers in a country that has more than 25% of the total world oil reserves. This is the largest reserve in any single country in the world; therefore, the oil industry will continue to play a leading role and to have the largest contribution to the economy. Based on this fact, it seems that, among other engineering and scientific disciplines, the petroleum engineers will have the most secure and guaranteed jobs in the future.

Whenever an exploration team becomes confident about the existence of certain geological formations, which contain oil or gas, petroleum engineers start designing and setting up a general plan for the drilling programs. Then they study the amount of oil and gas reserves and the optimum methods for oil and gas production at the minimum cost, and the best methods for preserving the energy of the reservoir, keeping in mind the special conditions of each reservoir. This requires the collaboration of drilling, reservoir and production engineers. And because of the need to acquire all these skills, basic sciences are interconnected with the specialized petroleum and natural gas engineering sciences in an integrated program leading to B.Sc. degree in petroleum engineering.

Both fundamental and applied courses are included in the curriculum, relating to the areas of reservoir engineering, drilling engineering, production engineering, petroleum transportation and petroleum economics. Computer work in petroleum engineering is stressed on to better prepare the graduate engineer to work in the complex world of modern technology. Much emphasis is needed on practical training, whether in the laboratory or in the field. The department has well-equipped laboratories in different disciplines.

These laboratories are divided to students work, and research laboratories. Also, the department has advanced computational laboratory supported with highly sophisticated softwares. These softwares include reservoir simulation, well test, reservoir characterization, drilling simulators, and other packages that are used to enhance the understanding of the various petroleum and natural gas engineering operations.

The oil companies working in the Kingdom attract and employ the largest number of petroleum engineering graduates, where they have good opportunities to practice and apply the knowledge they have acquired during their academic study. They enjoy attractive financial benefits as well as chances for studying and training missions inside and outside the Kingdom. Governmental agencies such as the Ministry of Petroleum and Mineral Resources and Saudi Aramco employ a large number of petroleum engineering graduates. Service companies; which are an integral part of the oil industry, also present attractive job opportunities.

The department currently has 22 staff members: 2 Full Professors, 2 Associate Professors, 6 Assistant Professors, 4 Lecturers, and 3 teaching assistants, 4 Technicians, and 1 secretary.

### **PGED Vision**

To be internationally recognized as a premier academic Department of Petroleum and Natural Gas Engineering.

### **PGED Mission**

The department of Petroleum and Natural Gas Engineering strives at:

1. Providing high quality learning programs, training and research activities;
2. Graduating students with required skills to compete at international level; and
3. Attracting and developing high caliber faculty members.

### **PGED Mission**

The Department of Petroleum and Natural Gas Engineering goals are:

1. Maintaining national and international academic accreditation.
2. Creating a strong relationship with the society particularly the oil and gas industry.
3. Producing highly qualified graduates each year.

### **PGED Program Educational Objectives**

4. Graduates will perform as highly skilled engineers in the local and international petroleum and natural gas industry.
5. Graduates will continue to learn, improve and evolve in their jobs.
6. Graduates may pursue higher education to participate in academia and involve in research.

### **PGED Students Learning Outcomes**

- a. Apply the knowledge of mathematics, geology, physics, chemistry as well as other engineering sciences.
- b. Conduct experiments safely and accurately and to be able to correctly analyze the results.
- c. Design an engineering process or system to meet desired needs.
- d. Work in a team environment.
- e. Identify, formulate and solve engineering problems.
- f. Understand professional and ethical responsibilities.
- g. Communicate successfully and effectively.
- h. Understand the impact of engineering solutions in a global, economic, environmental and societal contest.
- i. Recognize of the need for, and an ability to engage in life-long learning.
- j. Knowledge of contemporary issues.
- k. Understand the use of modern techniques, skills and modern engineering tools necessary for petroleum and natural gas engineering practice.

### **King Saud University Strategic Plan -I- Objectives (2010-2015)**

1. Advance in international ranking through strengthen our comprehensive university with academic areas of research and teaching excellence.
2. Attract and develop distinctive faculty.
3. Achieve quality needed through: reducing KSU's student volume, increasing the share of graduate students, and raising entry requirements.
4. Enable KSU students to learn hard and soft skills throughout their academic life.
5. Build Bridges internally within KSU and externally with local and international groups.
6. Create an engaging environment at KSU for faculty, students, and staff.
7. Build KSU's endowment and diversity sources of funding.
8. Create a performance contract with the government.
9. Establish an organization and governance model that support KSU's mission.

## **College of Engineering Strategic Plan -II- Objectives (2011-2016)**

1. Provide excellent academic programs that best reflect the current needs and requirements of the profession.
2. Recruit, nurture and retain outstanding students.
3. Recruit, nurture and retain outstanding faculty.
4. Empower the College research.
5. Establish a strong outreach and external business collaborations with industry, government and other entities in the society.
6. Establish and maintain effective and efficient support services, facilities, and infrastructure.

## **SWOT Analysis for PGED Activities**

### ***Strength***

1. A curriculum designed to meet both local and international standards (i.e., NCAAA and ABET).
2. Located near the world's largest oil and gas reserves, and production activities.
3. Competent and dynamic faculty (sufficient number and excellent academic backgrounds).
4. Well-equipped laboratories, library and IT Facilities.
5. Supportive industrial advisory board.
6. Excellent support by Dean of College of Engineering (COE), and KSU Rector.
7. Attractive departmental social environment (SPE-KSU Chapter and PGED Students Club).

### ***Weakness***

1. Insufficient annual budget.
2. Complicated decision-making process at the university level (for example: complicated and restrictive purchasing and staff hiring procedures).
3. Deficiencies in some skills in the graduating students (such as communication skills).
4. Lack of real data and samples for utilization in teaching and real-life research activities.
5. Inadequate support by the national and international oil companies operating in Saudi Arabia.

### ***Opportunities***

1. Available staff development opportunities.
2. Possibility of utilizing local mentor for teaching and research.
3. More input in devoting Saudi Arabia towards knowledge based society.
4. Providing the region with professional teaching and research activities.
5. Located in young and dynamic society (A good pool for potential students readiness to accept changes).

### ***Threats***

1. Insufficient job opportunities for the graduates of the department.
2. Attraction of available qualified staff by the neighboring countries (schools and industry).
3. Declining enrollment (interest) in petroleum engineering (lack of sufficient number of quality students with strong interest in petroleum engineering, and inadequate public awareness for engineering profession and job opportunities).

## **Methodology for the Development of PGED Strategic Plan -I- Objectives**

After a careful review of SWOT analysis, six strategic objectives have been established to address the weaknesses and threats identified. For each strategic objective, a number of actions are developed which exploits the strengths and opportunities. Furthermore, an operational plan including the strategies, specific actions, responsibilities, success metrics, and a suggested timeline has been proposed. It is anticipated that each responsible body will develop its own operational plan to implement the proposed actions. During this time, required resources should be identified and some possible adjustments need to be made for a realistic timetable.

### **PGED Strategic Plan -I- Objectives**

A closer examination of the SWOT analysis reveals that departmental strategic plan should focus on the improvements that are related to students, teaching methods and staff. Therefore, the following strategic objectives have been developed.

#### **OBJECTIVE 1: Improve Teaching and Learning Process.**

##### **ACTIONS:**

- 1.1: Implement continuous assessment and improvement process.
- 1.2: Acquire and retain national (NCAAA) and international (ABET) accreditations.
- 1.3: Recruit and retain outstanding faculty and staff.
- 1.4: Attract and retain outstanding students through scholarships ending with recruitment.
- 1.5: Establish twining and/or inter-institutional exchange programs.
- 1.6: Provide the students with professional experiences through the SPE-KSU Chapter and PGED students club activities.
- 1.7: Utilize most recent commercial softwares in appropriate courses.
- 1.8: Establish a visiting professor/lecture series program to enhance undergraduate/graduate level courses.
- 1.9: Subscribe to specialized research and academic databases such as SPE-OnePetro.
- 1.10: Continuous updating of the department library.

#### **OBJECTIVE 2: Create a Strong Relationship with Society in Particular with Oil and Gas Industry.**

##### **ACTIONS:**

- 2.1: Establish and retain Industry Advisory Board.
- 2.2: Promote research and consultation that address needs of the society.
- 2.3: Expand and improve the postgraduate program.
- 2.4: Establish alumni database.
- 2.5: Establish a new program called: “Minor in Petroleum and Natural Gas Engineering” for students from other engineering specialties.
- 2.6: Establish PhD program in Petroleum and Natural Gas Engineering.

#### **OBJECTIVE 3: Continue to Develop and Maintain an Adequate Infrastructure.**

##### **ACTIONS:**

- 3.1: Improve existing teaching and research laboratories.
- 3.2: Convert the seminar room to a smart room.
- 3.3: Expand and improve the department computer room and its facilities.

#### **OBJECTIVE 4: Increase Domestic and International Publicity.**

##### **ACTIONS:**

- 4.1: Enhance participation in conferences, symposia, and workshops.
- 4.2: Improve the departmental website.



- 4.3: Establish short courses for the industry.
- 4.4: Enhance Faculty participation in conferences, symposia, and workshops.
- 4.5: Enhance faculty publications in ISI journals.

**OBJECTIVE 5: Research Enhancement.**

**ACTIONS:**

- 5.1: Sign an umbrella agreement with Saudi Aramco to enhance joint research.
- 5.2: Establish petroleum related measurements, testing, and consultation services.
- 5.3: Activate the existing Enhance Oil Recovery “IOR” research chair through new fund.
- 5.4: Establish a new research chair in “Rock Physics”.

Details of the PGED strategic plan -I- for the period 2014-2020 G are shown in **Table 1**. The details include, objectives and actions involved, required execution budgets, duration, responsible bodies, assessment techniques and key performance indicators.

**Acronyms**

C:	College of Engineering
U:	King Saud University
D:	PGED
IAB:	PGED Industry Advisory Board
S:	PGED Students
F:	PGED Staff
I:	Oil and Gas Industry

**Conclusions**

1. This strategic plan is a tool that should be used to help in shaping and guiding the PGED to formulate and resolve key issues that are facing the department as well as to become more effective in a rapidly changing world.
2. The execution of this strategic plan requires continuous moral and financial support of KSU and COE.
3. Continuous inputs of all PGED constituents are crucial for the success of this strategic plan.
4. Support of the local and international oil and gas industry, especially Saudi Aramco, is crucial to the success of this strategic plan.

**Table 1:** Details of PGED Strategic Plan -I- (1436-1440 H - 2014-2020 G).

Petroleum and Natural Gas Engineering Department (PGED) Strategic Plan I (1436-1440 H – 2014-2020 G)					Objectives Mapping	
Details	Actions	Budget, SR	Responsibility*	KPI's and Assessment	COE Strategic Plan -II-	KSU Strategic Plan -I-
<b>Objective 1:</b> Improve teaching and learning process.	1.1	KSU Full support	All	Periodic local (NCAAA) and international (ABET) accreditation.	1	1- 4
	1.2	100,000SR/year	All	Retain accreditation.		
	1.3	KSU Full support	D, C, and U	Department annual report.		
	1.4	5 scholarships/year	D, and I	25% of graduating students with GPA $\geq$ 4.0 out of 5.0		
	1.5	KSU Full support	D, C, and U	Department annual report.		
	1.6	50,000SR/year	D and S	KSU-SPE chapter annual report.		
	1.7	KSU Full support	D, C, U, F, and I	Availability of the most common softwares used by the industry.		
	1.8	KSU Full support	D, C, U, and I	Annual seminar program report and one of visiting professor per year at least.		
	1.9	KSU Full support	D, C, and U	Continuous subscription in teaching and research data base (e.g., SPE-OnePetro).		
	1.10	KSU Full support	D, C, and U	Purchase up to date specialized books and teaching materials.		
<b>Objective 2:</b> Create a strong relationship with society in particular with oil and gas industry.	2.1	KSU Full support	D, C, U, and I	Gathering the Industry Advisory Board (IAB) committee once a year at least.	5	5
	2.2	KSU Full support	D, C, U, F, and I	One research project per faculty member per year at least.		
	2.3	50,000SR/Year	D, C, U, F, and I	Recruiting 10 M.Sc. students per year at least. Establish Ph.D. Program.		
	2.4	100,000 SR/Year	D	Holding two alumni gatherings in Riyadh and Dammam once a year at least.		
	2.5	KSU Full support	D, C, and U	Start the proposed program in the 1 <sup>st</sup> semester 2016-2017.		
	2.6	KSU Full support	D, C, and U	Start the proposed program in the 1 <sup>st</sup> semester 2018-2019.		
<b>Objective 3:</b> Continue to develop and maintain an adequate infrastructure.	3.1	KSU Full support	D, C, and U	Number of purchased equipment. At least one technician per laboratory.	6	6
	3.2	KSU Full support	D, C, and U	Renovation of the seminar room to accommodate at least 40 attendees.		
	3.3	KSU Full support	D, C, and U	Expand to accommodate at least 20 students.		
<b>Objective 4:</b> Increase domestic and international publicity.	4.1	KSU Full support	D, C, U and F	One participation per faculty per two year at least.	-	1
	4.2	KSU Full support	D	Weekly update of the website.		
	4.3	KSU Full support	F	One short course per department per year at least.		
	4.4	KSU Full support	F	One participation per faculty per year at least.		
	4.5	KSU Full support	F	Two ISI papers per faculty per year at least.		
<b>Objective 5:</b> Research Enhancement.	5.1	KSU Full support	D, C, and U	Sign the agreement before the end of 2015.	4,5&6	5,6&7
	5.2	KSU Full support	D, and F	Start these services before the end of 2015.		
	5.3	KSU Full support	D, and F	Get the required fund before the end of 2015.		
	5.4	KSU Full support	D, C, U and F	Get approval and the required fund before the end of 2016.		

\* C: College; U: University; D: Department; IAB: Industry Advisory Board; S: Students; F: Staff; I: Industry