جامعة الملك سعود
King Saud University

College of Engineering

Petroleum and Natural Gas Engineering

King Saud University

College of Engineering

Petroleum and Natural Gas Engineering Department

(PGED-KSU)

ABET and NCAAA Accredited Program

ABET Engineering Accreditation Commission

July, 2021

OVERVIEW

The Department of Petroleum and Natural Gas Engineering (PGED) was established in 1973 to become the first Petroleum and Natural Gas Engineering Department in the Kingdom and the entire Gulf 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. A simple calculation shows that with the prevailing current oil production rate, this reserve will last more than 100 years. This indicates that the oil industry will continue to play a leading role and to have the largest contribution to the economy. Based on these facts, it seems that, among other engineering and scientific disciplines, the petroleum engineers will have the most secure jobs in the future.

Whenever an exploration team becomes confident about the existence of certain geological formations which may contain oil or natural gas, petroleum engineers start designing and setting up a general plan for the drilling programs. Then they study the amount of oil and natural 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. Because of the need to acquire all these skills, basic sciences are interconnected with the specialized engineering sciences in an integrated program leading to B.Sc. degree in petroleum and natural gas engineering. Both fundamental and applied courses are included in the curriculum, relating to the engineering areas of exploration, reservoir, drilling, production, transportation, economics, and natural gas. It is stressed on computer applications in petroleum engineering in order to better prepare the graduate engineer to work in the complex world of modern technology. In a developing country, more emphasis is needed on practical training, whether in the laboratory or in the field.

The department has well-equipped laboratories in different disciplines. Oil and natural gas companies working in the Kingdom attract and employ the largest number of the petroleum and natural gas 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. Other governmental agencies such as the Ministry of Petroleum and Minerals, SABIC, KACST, etc. employ a large number of petroleum and natural gas engineering graduates. Service companies which are an integral part of the oil industry also present attractive job opportunities.

VISION

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

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
3. Attracting and developing high caliber faculty members

GOALS

The objectives of the department of Petroleum and Natural Gas Engineering are:

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

PROGRAM EDUCATIONAL OBJECTIVES

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

PROGRAM STUDENT OUTCOMES

These student outcomes are distributed among the program courses according to the ABET requirements.

SO1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.

SO2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.

SO3. An ability to communicate effectively with a range of audiences.

SO4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.

SO5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.

SO6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.

SO7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

ACCREDITATION HISTORY

The Petroleum and Natural Gas Engineering program is accredited by the Engineering Accreditation Commission, http://www.abet.org and from National Commission for Academic Accreditation & Assessment (NCAAA) for the periods 2010-2022 and 2016-2023, respectively. The next ABET re-evaluation visit will be conducted virtually starting from October 31st, 2021. Additionally, the Master program is currently applying for accreditation by the National Commission for Academic Accreditation & Assessment (NCAAA).

ADMINISTRATION HISTORY

The administration history of the Department of Petroleum and Natural Gas Engineering at King Saud University since its establishment in 1973 is as follows:

1. Dr. Ahmed AlHaj Toutonji, Chairman, 1973 – 1980
2. Dr. Yahya Bakri ElNady, Chairman, 1980 – 1984
3. Dr. Adnan Eid Omar, Chairman, 1984 – 1990
4. Dr. Adel Mohamed Hemeida, Chairman, 1990 – 1992
5. Dr. Mohammed Saud AlBlehed, Chairman, 1992 – 1995
6. Dr. Mansour Saleh AlMalik, Chairman, 1995 – 1997
7. Dr. Musaed Nasser AlAwad, Chairman, 1997 – 2003
8. Dr. Emad Soliman AlHomadhi, Chairman, 2003 – 2009
9. Dr. Musaed Nasser AlAwad, Chairman, 2009 – 2016
10. Dr. Ali Soliman Alnetaifi, Chairman, 2016-2019
11. Dr. Mohammed Abdullah Almobarky, Chairman, 2019 - now

FACULTY MEMBERS AND STAFF

The Petroleum and Natural Gas Engineering Department teaching staff have variety of disciplines covering all the classical branches of petroleum and natural gas engineering. They have a distinct scientific and research activities. They hold degrees from well-known universities worldwide from United States, United Kingdom, Canada, Australia, Germany, and Egypt. This diversity represents a unique educational process where the experiences of several petroleum schools are met in a single department.

PROFESSORS

1. Musaed N. J. AlAwad, (Ph.D), Heriot-Watt University, Edinburgh, UK, Drilling Engineering (Geomechanics), malawwad@ksu.edu.sa, Full-time.
2. Emad Souliman AlHumadhi, (Ph.D), Heriot-Watt University, Edinburgh, UK, Drilling Engineering (Formation Damage), ehomadhi@ksu.edu.sa, Full-time.
3. AbdulRahman Ali AlQuraishi, (Ph.D), Colorado School of Mines, USA, Reservoir Engineering (Fluid Properties), aquraisi@kacst.edu.sa, Part-time.
4. Omar AbdulAziz AlMisned (Ph.D), University of Oklahoma, USA, Reservoir Engineering (Sand Control), almisned@kacst.edu.sa, Part-time.

ASSOCIATE PROFESSORS

1. Aref Lashin, Exploration, (Ph.D), Freiberg University, Germany & Benha U., Egypt, Petroleum Geology & Exploration, (Geophysics), arlashin@ksu.edu.sa, Full-time.
2. Khaled A. ElShreef, (Ph.D), Cairo University, Egypt, Drilling Engineering (Drilling Fluids), kelshreef@ksu.edu.sa, Full-time.
3. Taha Moawad, (Ph.D), Clausthal Technical University, Germany, Reservoir Engineering (Reservoir Management & EOR), tmoawad@ksu.edu.sa, Full-time.

ASSISTANT PROFESSORS

1. Osama A. ElMahdy, (Ph.D), Al-Azhar University, Egypt, Reservoir Engineering (Improved Oil Recovery), omahdy@ksu.edu.sa, Full-time.

2. Mustafa M. Kinawy, (Ph.D), Al-Azhar University, Egypt, Reservoir Engineering (Enhanced Oil Recovery), mkinawy@ksu.edu.sa, Full-time.
3. Abiodun Matthew Amao, (Ph.D), Texas Tech University, USA, Reservoir Engineering (EOR & Formation Evaluation), aamao@ksu.edu.sa, Full-time.
4. Mohammed Khamis, (Ph.D), King Fahd University for Petroleum and Minerals, KSA, Reservoir Engineering (Drilling Optimization), mokhamis@ksu.edu.sa, Full-time.
5. Ali S. AlNetaifi, (Ph.D), New South Wales University, Australia, Reservoir Engineering (Improved Oil Recovery), aalnetaifi@ksu.edu.sa, Full-time.
6. Mohammed Almobarky, (Ph.D), Texas A&M University, USA, Reservoir Engineering (Enhanced Oil Recovery), mmobarky@ksu.edu.sa, Full-time.
7. Fahd M. Alqahtani, (Ph.D), Norwegian University of Science and Technology, Norway, Reservoir Engineering (Phase Behavior Modeling & EOR), fahalqahtani@ksu.edu.sa, Full-time.
8. Naif Bandar Alqahtani, (Ph.D), Colorado School of Mines, USA, Production Engineering (Carbon Storage Studies), nqahtani@kacst.edu.sa, Part-time.

LECTURERES

1. Mohammed Al-Thehibey, (M.Sc.), University of Calgary, Canada, Production Engineering, malthehibey@ksu.edu.sa

TEACHING ASSISTANTS

1. AbdulRahman Z. Al-Amri, (M.Sc.), University of Calgary, Canada, Reservoir Engineering, azalamri@ksu.edu.sa
2. Faisal S. Al-Tawati, (M.Sc.), Texas Tech. University, USA, Production Engineering, ftawati@ksu.edu.sa
3. Mohammed A. Alamro, (B.Sc.), West Virginia University, USA, malamro@ksu.edu.sa

RESEARCHERS AND TECHNICIANS

1. Kamal A. Haroon, (M.Sc.), King Saud University, Saudi Arabia, Drilling Engineering, kharoon@ksu.edu.sa
2. Saeed H. Al-Homoud, (M.Sc.), King Saud University, Saudi Arabia, Production Engineering, shomoud@ksu.edu.sa
3. Abdullah S. Al-Fayfi, (M.Sc.), King Saud University, Saudi Arabia, Reservoir Engineering, aalfayfi@ksu.edu.sa
4. Abdullah A. Al-Subaie, (B.Sc.), King Saud University, Saudi Arabia, Petroleum Engineering, subaie@ksu.edu.sa

CURRENT ADMINSTRATIVE STAFF

1. Mohammed A. Almobarky, Assistant Professor, Chairman, mmobarky@ksu.edu.sa
2. Abdulaziz H. Al-Thubaity, Secretary, thubaity@ksu.edu.sa
3. Saleh Alhaji, Secretary, salhaje@ksu.edu.sa

DEGREES OFFERED

1. Bachelor of Science in Petroleum and Natural Gas Engineering
2. Master of Science in Petroleum and Natural Gas Well Drilling Engineering
3. Master of Science in Petroleum and Natural Gas Reservoir Engineering
4. Master of Science in Petroleum and Natural Gas Production Engineering
5. Ph.D. in Petroleum and Natural Gas Production Engineering (Pending)
6. High Diploma in Petroleum and Natural Gas Engineering (Pending)
7. Minor in Petroleum and Natural Gas Reservoir Engineering (Pending)
8. Minor in Petroleum and Natural Gas Well Drilling Engineering (Pending)
9. Minor in Petroleum and Natural Gas Production Engineering (Pending)

STUDENTS ACADEMIC ADVISING

Academic advising of students in the PGED is divided into three stages and the responsibilities associated with each stage are distributed among the faculty of the PGED. These stages include: pre-college advising for high-school students, COE fresh undergraduate students, and PGED students.

Pre-College (High School) Students: The PGED arranges frequent in campus visits for high school students to the department. This is done after locating the department website. Within the visit, high school students tour of the facilities by a faculty member. Presentation is normally given by a faculty member to inform them on the department's requirements and future available careers for the graduates. At the end of the visit, PGED Bulletin and other leaflets are distributed among the visitors.

College Fresh Undergraduate Students: At the beginning of each term the department makes presentations for freshman students in the College of Engineering to inform them about the **department's** requirements, education and examination rules and future available careers for PGED graduates. Furthermore, these students are invited to tour of the department facilities and interact with PGED faculty members.

Petroleum and Natural Gas Program Students: The advising in the department begins as soon as the student joins the PGED. After that, each student is assigned to an advisor among the faculty members. The advising lists are announced to students and posted on several places in the PGED. These lists are updated each year to include new fresh students.
Advisors are responsible for:

1. Following up his student's performance throughout their study.
2. Ensuring that each student in the department follows strictly the published curriculum.
3. Providing assistance in solving any difficulties they may encounter.
4. Advising them about future careers.

Faculty members follow-up their students through the "e-register database" located in the university server. Through this system, the faculty can access to the students' transcripts, current registered courses, remaining courses for graduation, etc.

Additionally, a social one-day trip is arranged annually to strengthen the relationship between PGED students and faculty members.

THE INDUSTRY ADVISORY BOARD

The advisory board members of the Department of Petroleum and Natural Gas Engineering at King Saud University are professional volunteers from the oil and gas industry, research institutes, governmental agencies and private consultants. The advisory board assembles at least once a year at the department to convey current challenges facing the oil and natural gas industry into the department future plan.

Additionally, the advisory board members are heavily involved in the assessment and improvement of the PGED academic programs and research orientation. In summary, the advisory board members are steering the department attitude for future success. Current advisory board members are:

1. Dr. Abdulrahman A. AlQuraishi, Professor of Petroleum Engineering, Research Professor and former Director National Center of Petroleum and Earth Exploration Technology, King Abdulaziz City for Science and Technology, Riyadh, Saudi Arabia.
2. Dr. Mohammed S. AlBlehed, Professor of Petroleum Engineering and Consultant, Seder Group, Riyadh, Saudi Arabia.
3. Dr. Mansour S. AlMalik, Professor of Petroleum Engineering and Chairman of Al-Malik Company, Riyadh, Saudi Arabia.
4. Dr. Omar A AlMisned, Research Professor of Petroleum Engineering, National Center of Petroleum and Earth Exploration Technology, King Abdulaziz City for Science and Technology, Riyadh, Saudi Arabia.
5. Dr. Naif AlQahtani, Research Assistant Professor of Petroleum Engineering, Director, National Center for Carbon Management Technology, King Abdulaziz City for Science and Technology, Riyadh, Saudi Arabia.
6. Engineer Saud S. AlOtaibi, Petroleum Engineer, Former Manager, Gas Drilling Department, Saudi Arabian Oil Company (Aramco), Dhahran, Saudi Arabia.
7. Engineer Naif Al-Dandeni, Director, Sales and Account Management, Oilfield Equipment, Baker Hughes, Dhahran, Saudi Arabia.
8. Engineer Mohammed H AlOtaibi, Supervisor, Simulation Section, Al Khafji Joint Operations (KJO), Khafji, Saudi Arabia.
9. Engineer Salman S AlSrami, Supervisor, Planning and Support Unit at Refinery Department, Saudi Arabia Oil Company (Aramco), Riyadh, Saudi Arabia.
10. Engineer Hathaal M. Al-Buraik, Production Engineer, Southern Area Production Engineering Department, Saudi Arabian Oil Company (Aramco), Udhailiyah, Saudi Arabia.

STUDENTS' COUNCIL

The PGED students' council is the representative body of the entire student community of the Petroleum and Natural Gas Engineering Department. It is the interface between the students and the PGED administration and work to identify and address concerns that affect the students directly and indirectly. It represents the interests of the students and participates in discussions and decisions that affect the student community. The PGED student's council organizes several extracurricular

events through the academic year and coordinates the student volunteer effort for the College and Department events that are organized periodically. The PGED student's council is led by the Chairman, the General Secretary and the Treasurer. The members of the governing council are elected at the beginning of each academic year. The PGED student's council chairman represents the PGED students in the College student's council.

STUDENT'S SPE CHAPTER

The SPE-KSU chapter was established in the year 2000 to involve students of the department in various oil and gas industry activities such as field trips to the offshore and onshore activities of various oil and gas companies. SPE-KSU chapter members participate in the SPE-SAS chapter annual technical symposium, annual young professional symposium, and SPE-SAS sand rose publication. SPE-KSU chapter won the "Outstanding Award" two times in a row, 2012 & 2013 by the SPE-SAS. Also, won the "SPE International Gold Standard Award" for two times, 2011 & 2014 among the top 20 winners worldwide.

PGED STUDENT'S CLUB

The PGED students club is established to provide the department students with facilities and place to spend extra time. The students club works in conjunction with the SPE chapter to fulfill the student's extracurricular activities.

QUALITY ASSURANCE

Program vision, mission, goals, educational objectives, learning outcomes, and other standards are assessed frequently for quality assurance control as shown in Figure 1.

LABORATORIES

The petroleum and natural gas engineering department has many laboratories that are used for both teaching and research.

PVT Laboratory: is used for the understanding of the behavior of hydrocarbon fluid under different pressure and temperature conditions as well as the rate of change of basic fluid properties with the change of pressure and temperature.

Reservoir Rock Properties Laboratory: is equipped with instruments to measure the physical properties of reservoir rocks. Also, experiments are designed to conduct research projects towards a better physical understanding of enhanced oil recovery processes as well as the production mechanisms of horizontal and vertical wells for improving production.

Production Engineering Laboratory: is designed to test crude oil properties depending on API specifications and recommendations and to find out the optimum condition for production, transportation and storage of crude oils.

Drilling Engineering Laboratory: is equipped with apparatuses to determine drilling fluid properties at atmospheric and high pressure high temperature conditions by direct measurements. These properties include rheological, filtration, density, thermal stability, lubricity, resistivity, pH, etc.

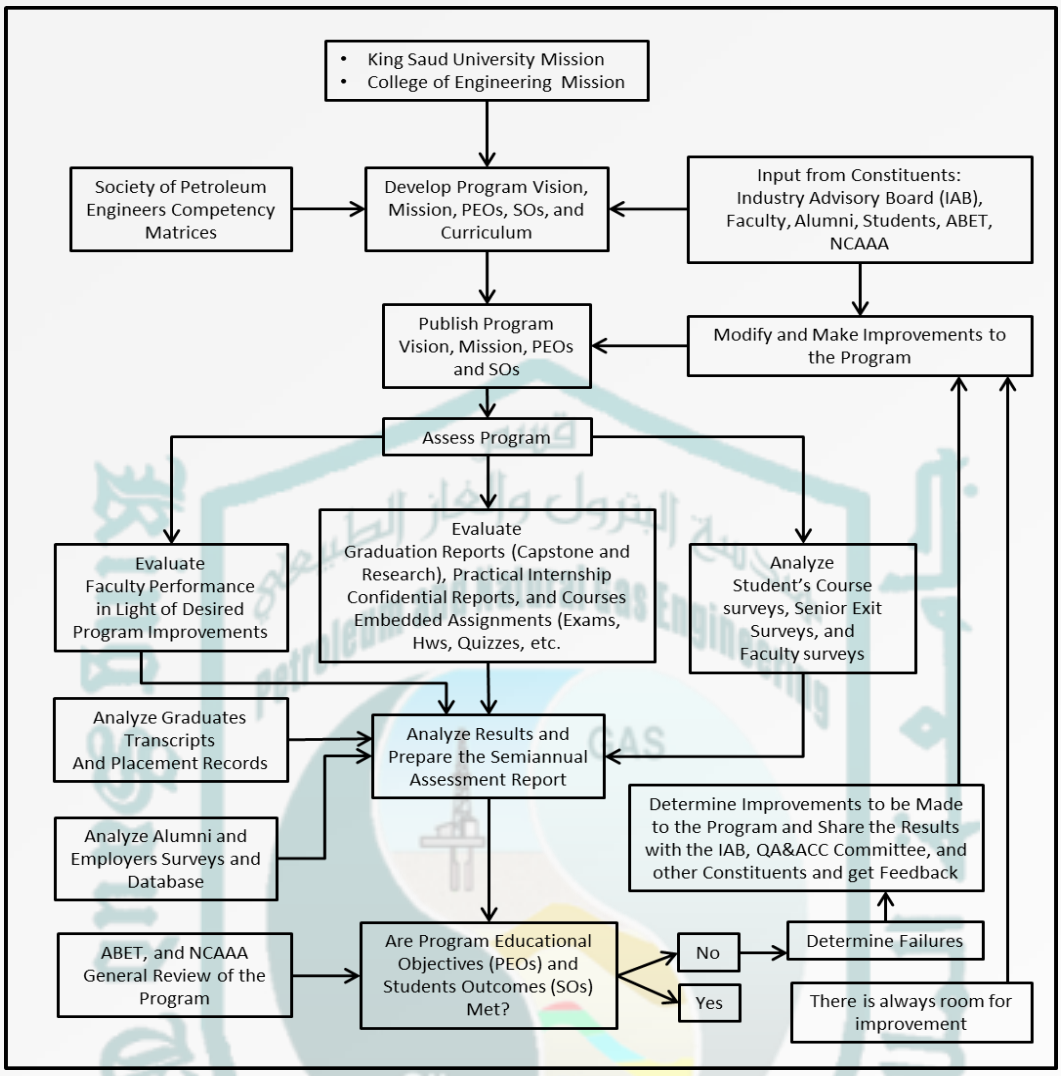

Figure 1: Program Assessment Cycles

Cement and Rock Mechanics Laboratory: is equipped with necessary tools for testing cement used to support casing string and borehole sides. These tests include thickening time at atmospheric and high pressure high temperature conditions, compressive strength under uniaxial and triaxial loadings, shear strength, failure criteria, mechanical and elastic properties of reservoir rocks and set cement.

***Computer Laboratory*:** The PGED department has dedicated a computer laboratory that is equipped with computers with software necessary for the learning process and with internet connection for students to access the web resources. The students could also connect to internet using the KSU student wireless access points. Students also have access to the COE computer center.

RESEARCH ACTIVITIES

Research in the Petroleum and Natural Gas Engineering Department at KSU involves activities that have immediate usefulness in managing drilling, field development, operations, well stimulation, and other production and reservoir problems. In addition

to the EOR research chair activities, some other on-going research projects include: miscible and immiscible gas-oil displacement, sand production management, oily water treatment, oily water re-injection, wettability alteration, new enhanced oil recovery physical methods, drilling fluids design from local clays, formation damage, production optimization, gas hydrates, environmental issues, and CO_2 capturing, storage and utilization in EOR.

CONTINUING EDUCATION

The continuing education program at the PGE-KSU is designed to provide engineers from the private and governmental sectors with short educational courses that are highly flexible and customized to meet their needs. The available short courses are: petroleum reservoir engineering, natural gas reservoir engineering, well logging, enhanced oil recovery, water flooding, basics of petroleum engineering for non-petroleum engineers, petroleum related rock mechanics, PVT and phase behavior of reservoir fluids, modern well test analysis, reservoir characterization, and horizontal well technology.

Core Analysis Laboratory

Production Laboratory

Drilling Fluids Laboratory

Rock Mechanics and Cement Laboratory

Research Laboratory

Enhanced Recovery Laboratory

BACHELOR OF SCIENCE PROGRAM

ADMISSION REQUIREMENTS & REGULATIONS

The College admits about 600 students every year, with clear admission criterion that is based on having General High School Certificate (Science Section) with a minimum composite score of 80%. The 100% composite score is distributed among: 30% for the high school test, 30% for Capabilities Test and 40% Achievement Test. It should be noted that the Capabilities Test administrated by the National Center for Assessment in ETEC is similar to the General Aptitude Test (GAT) or to the Scholastic Aptitude Test (SAT). The Achievement Test was introduced in 2007. It is a subject achievement test whose score is reported as a composite score of a test administered in the following subjects: Math, Physics, Chemistry, Biology, and English. Students are required to take this test prior to application for admission to the university. In addition, the student must have a minimum score of 87% in mathematics, physics and chemistry. However, such criterion can vary depending on the admission policy of the college.

ADMISSION OF STUDENTS ACHIEVED THE COMMON FIRST YEAR

Students are accepted by merit according to the following rule

$$0.25\ x\ Mark\ of\ Achievement\ Test\ +\ 0.25\ x\ Mark\ of\ Capabilities\ Test + 5\ x\ cumulative\ GPA\ of\ Common\ first\ year + Points\ of\ the\ course\ Math101$$

The college accepts about 450 students for the first semester and 50 students for the second semester. The general rule of the college is to reach the target value of the student to faculty ratio of 20 recommended by the Ministry of Education.

INTERNAL STUDENT TRANSFER

1. Students from Science Colleges of KSU must have a minimum cumulative GPA of 4.0 out of 5.0 and have grade B in Math.
2. Student from KSU Health Colleges must have a minimum cumulative GPA of 4.35 out of 5.0, and they should have completed successfully or obtained an equivalence of the Common first year for the Science Colleges.

3. The cumulative GPA is calculated after a student completes at least 12 hours after the Common first year (not including courses of the university requirements: Islamic culture and Arabic language).
4. If the College's intake capacity is exceeded, the Dean of the COE may accept no more than fifty students satisfying the transfer criteria.
5. Acceptance of students is done by merit when all the conditions are satisfied.
6. Transfer from Humanities Colleges is not accepted.

EXTERNAL STUDENT TRANSFER

1. The student must have a minimum cumulative GPA of 4.25 out of 5.0 or its equivalent from an accredited college of engineering.
2. The student must have a minimum score of 80% in mathematics courses studied in his college.
3. The student must not have successfully completed more than 35 credit hours after the first common year or equivalent requirements for college of engineering at his university.
4. If the student did not study a common first year in his college, the University has the right to ask the student to study the KSU Common first year for Science Colleges, or otherwise what the University deems suitable after carrying out all the equivalences for the student).

Once these conditions are satisfied, the student is considered as a visiting student and is allowed to register at least 12 credit hours according to his study plan in his previous college and in coordination with the COE at KSU. The 12 credit hours should not include courses of Islamic culture and Arabic language. The student must also obtain a GPA in that semester of at least 4.00 out of 5.00.

STUDENTS ALLOCATION TO COLLEGE DEPARTMENTS

1. During their first year at the college after the first common year, students have to attend introductory orientation presentations offered by the college departments so as to get acquainted with the nature of the different engineering disciplines.
2. After successfully passing 28 out of the 34 credit hours of the first year at the college, a student must submit electronically a request to the Deanship of Admission & Registration, prioritizing his preference of the different disciplines.
3. Each department is given a number of students in accordance to its capacity and arrangement with the department and college.
4. The priority of acceptance for admission in a department is given to those applicants with the highest GPA.

STUDENTS TRANSFER FROM OTHER DEPARTMENTS IN THE COLLEGE

1. Students from another department of the college must have a cumulative GPA higher than the lowest GPA admitted to the department
2. A prescribed form must be filled-in by the student for final approval by the College Students Affairs Unit
3. The priority of acceptance is given to the students with the higher grades, on the basis of available seats in each department

CREDIT TRANSFER

It is permissible for the students to transfer credits of courses studied in a reputable engineering college, if the courses are equivalent to those offered by the college departments. Approval of the department is perquisite for the transfer acceptance. The transferred credits should not be more than 40% of the total credits of a degree plan of the COE at KSU. Transferred credits are not included in the GPA, but a grade of at least C should be scored to pass courses.

PRACTICAL TRAINING

- A student is allowed to register for the practical (summer) training after successfully completes 110 hours, through the student portal (e-edugate). No other courses are allowed for the student during the practical training period.
- Local companies are contacted by Vice Dean for academic affairs to enquire about the possibilities of training the department students and the number of students that can be accepted.
- Replies from companies are kept in the electronic system of the college.
- All available training opportunities are sent to the department, and announced by the department for students.
- Student fill-in a form for the practical training and submit it to the department practical-training committee showing his choice of companies.
- Vice Dean officially contacts the companies and secures the placement of students.
- Student is required to have a 10-week training, and to submit weekly reports to the convener of the department committee for practical training.
- Company reports a confidential assessment of the student performance to the department.
- Department allocates the grade of the training as pass or fail based on the company evaluation and weekly reports.

Although the practical training is non-credited, it is required to satisfy the undergraduate degrees requirements.

ACADEMIC PROGRAMS

Bachelor of Science in Petroleum and Natural Gas Engineering

The courses required by the department towards the fulfillment of such a degree include all the following extensive aspects in petroleum and natural gas engineering:

Exploration Engineering: provides students with the basic principles of physical geology including historical and structural geology, the processes involved, geological data collection, and geological mapping. Subsurface environment, origin of petroleum, estimation of Petroleum generated, petroleum migration and accumulation, and classifications of different oil traps are also included. One of the important parameters for reservoir exploration is geophysical exploration methods and geological interpretation of geophysical data.

Drilling Engineering: introduces students to the fundamental engineering science principles for rotary drilling systems design, such as drill string design, hoisting system, casing string design, drilling bits selection, drilling fluids system, and fluid hydraulics. Also pore pressure, fracturing gradient, factors affecting penetration rate, cementing design, and hole problems are introduced in details as a very important aspects in well drilling engineering. Horizontal drilling and Well control are the most important subject that are being taught for students, including equipment, measurement, and calculations, and practices.

Production Engineering: introduces students to the different well completion techniques, oil producing zone performance, fluid flow in vertical pipes, design of wellhead and production pipes and subsurface control equipment and of oil lift by submersible pumps and gas uplift, computation of production rates, the design of the gathering systems, separation and treatment of oil and gas, well stimulation by hydraulic fracturing and acidizing of the producing zones, pipeline design for the transportation of oil and gas, and storage tanks.

Reservoir Engineering: introduces students to reservoir rocks properties, phase behavior of reservoir fluids, multiphase flow in porous media, application of mass, motion and energy balance on the petroleum reservoir, prediction of reservoir performance, reserve estimation, mechanics of oil recovery and secondary oil recovery by water and gas, polymer and surfactant flooding, use of well measurements to estimate reservoir properties, and numerical simulation methods to predict the 3-D reservoir performance.

Reservoir Evaluation: includes engineering and economic studies to determine the oil in place using different techniques where the properties of the oil and gas bearing zones are determined by the analysis of reservoir rock and fluid samples, and by electrical, sonic, and radioactive logging. Use of well pressure and the use of the different mathematical models to determine the average production rate of oil and gas under the different operating conditions. It also includes feasibility studies to determine the current cost of the petroleum projects and the current market oil price for the selection of the optimum operating strategies.

Computer Applications: includes the study of basic applications of fluid flow in reservoirs, the petroleum fluid properties and its change with temperature and pressure, applications of numerical techniques to solve petroleum and natural gas engineering problems, and introductory and advanced applications in reservoir engineering studies such as reservoir modeling, simulation and well test interpretation techniques.

Natural Gas Technology: includes evaluation of gas properties, estimation of natural gas reserve, wells performance, gas and condensate reservoirs performance and its pressurization, transportation of natural gas in pipes, and treatment of natural gases.

Economics: exposes students to the knowledge of oil and gas related organizations, oil prices history and criteria, and future oil and natural gas supply and demand predictions. Additionally, students are exposed to economical yardsticks such as net present value, rate of return, payout time, etc.

B.Sc. DEGREE REQUIREMENTS

After successfully passing the First Common year (32 credit hours), and to complete the graduation requirements for a B.Sc. in Petroleum and Natural Gas Engineering, the students are required to successfully pass a total of 133 credit hours. The typical PGED B.Sc. plan is shown below.

TYPICAL PGED B.Sc. PLAN

Level 1

Code & Number	Course Title	Cr. Hr.	Prerequisites
ENGS 10x	English language	6(6,9,0)	
MATH 101	Differential Calculus	3(3,1,0)	
ENT 101	Entrepreneurship	1(1,0,0)	
CHEM 101	General Chemistry	4(3,0,2)	
ARAB 100	Writing Skills	2(2,0,0)	
Total		**16**	

Level 2

Code & Number	Course Title	Cr. Hr.	Prerequisites
ENGS 11x	English	6(6,9,0)	
CUR 101	University Skills	3(3,0,0)	
CT 101	IT skills	3(0,0,6)	
STAT 101	Introduction to Statistics	3(2,2,0)	
EPH 101	Health & fitness	1(1,1,0)	
Total		**16**	

Level 3

Code & Number	Course Title	Cr. Hr.	Prerequisites
IC 1xx	Optional Islamic course	2(2,0,0)	
PHYS 103	General Physics (1)	4(3,0,2)	
MATH 106	Integral Calculus	3(3,2,0)	MATH 101
MATH 107	Vectors & Matrices	3(3,2,0)	MATH 101
ENGL 109	Language & Communication	2(2,1,0)	
GE 104	Basics of Engineering Drawing	3(2,0,2)	
Total		**17**	

Level 4

Code & Number	Course Title	Cr. Hr.	Prerequisites
PHYS 104	General Physics (2)	4(3,0,2)	PHYS 103
ENGL 110	Technical Writing	2(2,1,0)	ENGL 109
MATH 203	Differential and Integral Calculus	3(3,2,0)	MATH 106 MATH 107
GE 106	Introduction to Engineering Design	3(2,1,2)	GE 104
GE 201	Statics	3(3,1,0)	MATH 106; MATH 107
GE 203	Engineering and Environment	2(2,0,0)	CHEM 101; MATH 101
Total		**17**	

Level 5

Code & Number	Course Title	Cr. Hr.	Prerequisites
IC 1xx	Optional Islamic course	2(2,0,0)	---
MATH 204	Differential Equations	3(3-2-0)	MATH 203 (Pre-)
ME 340	Mechanical Engineering for Petroleum Students	3(3-1-0)	GE 201 (Pre-)
CHE 312	Momentum Transport Operations for Petroleum and Natural Gas Engineering Students	3(3-1-0)	---
GE 209	Computer Programming	3(2-0-2)	---
PGE 251	Introduction to Petroleum & Natural Gas Engineering	2(2-1-0)	---
Total		**16**	

Level 6

Code & Number	Course Title	Cr. Hr.	Prerequisites
PGE 361	Reservoir Rock Properties and Fluid Flow	2(2-1-0)	PGE 251 (Pre-)
CHE 304	Thermodynamics for Petroleum and Natural Gas Engineering Students	2(2-1-0)	---
PGE 362	Reservoir Fluid Properties	2(2-1-0)	PGE 251 (Pre-)
PGE 363	Reservoir Engineering Laboratory	2(1-0-2)	PGE 361 (Co-) PGE 362 (Co-)
PGE 391	Geologic Principles of Petroleum & Natural Gas Exploration	3(3-1-0)	PGE 251 (Pre-)
IC 1XX	Optional Islamic course	2(2,0,0)	---
MATH 254	Numerical Methods	3(3-2-0)	MATH 107 (Pre-)
GE 403	Engineering Economics	2(2,1,0)	
Total		**18**	

Level 7

Code & Number	Course Title	Cr. Hr.	Prerequisites
IC 107	Professional Ethics	2(2,0,0)	---
GE 402	Engineering Projects Management	3(3-1-0)	---
PGE 490	Petroleum & Natural Gas Exploration -1-	3(3-1-0)	PGE 391 (Pre-)
PGE 460	Petroleum Reservoir Engineering	3(3-1-0)	PGE 362 (Pre-) PGE 363(Pre-)
PGE 366	Natural Gas Reservoir Engineering	2(2-1-0)	PGE 362 (Pre-) PGE 363 (Pre-)
PGE 471	Drilling Engineering -1-	2(2-1-0)	PGE 490 (Co-)
Total		**15**	

Level 8

Code & Number	Course Title	Cr. Hr.	Prerequisites
PGE 492	Well Logging	3(3-1-0)	PGE 471 (Pre-)
PGE 474	Drilling Engineering –2-	3(3-1-0)	PGE 471 (Pre-) PGE 494 (Co-)
PGE 481	Production of Naturally Flowing Wells	3(3-1-0)	PGE 471 (Pre-)
PGE 464	Improved Oil Recovery	3(3-1-0)	PGE 460 (Pre-)
PGE 485	Petroleum Production Engineering Laboratory	2(1-0-2)	PGE 481 (Co-)
PGE 494	Petroleum & Natural Gas Exploration -2-	2(2-1-0)	PGE 490 (Pre-)
PGE 457	Computer Applications in Petroleum and Natural Gas Engineering	2(1-2-0)	PGE 460 (Pre-) PGE 366 (Pre-)
Total		**18**	

Level 9

Code & Number	Course Title	Cr. Hr.	Prerequisites
PGE 455	Transportation & Storage of Petroleum and Natural Gas	2(2-1-0)	PGE 481 (Pre-)
PGE 476	Drilling Engineering Laboratory	2(1-0-2)	PGE 474 (Pre-)
PGE 493	Well Test Analysis	3(3-1-0)	PGE 460 (Pre-)
PGE 484	Natural Gas Production Engineering	3(3-1-0)	PGE 366 (Pre-)
PGE 482	Artificial Lift Methods and Surface Operations	2(2-1-0)	PGE 481 (Pre-)
PGE 450	Seminar	2(1-2-0)	PGE 496 (Co-)
PGE 496	Graduation Project -1-	2(2-0-0)	Complete successfully 129 credits hours and passing all courses in levels 1-7.
Total		**16**	

Level 10

Code & Number	Course Title	Cr. Hr.	Prerequisites
PGE 491	Petroleum and Natural Gas Economics	2(2-1-0)	PGE 496 (co-)
PGE 486	Well Stimulation and Sand Production Management	3(3-1-0)	PGE 482 (Pre-)
PGE 478	Directional & Horizontal Drilling and Well Control	3(3-1-0)	PGE 474 (Pre-)
PGE 467	Reservoir Simulation	3(3-1-0)	PGE 460 (Pre-) MATH 204 (Pre-)
SC 1XX	Free College Course	2(2-x-0)	
PGE 497	Graduation Project – 2 -	2(2-0-0)	PGE 496
PGE 999	Practical Training	1 (NP)	Complete successfully 110 credits hours
PGE 998	Research Project	0 (NP)	Successful completion of 129 cr. hr
Total		**16**	

BRIEF DESCRIPTION OF B.SC. COURSES

ENGS 100: English language ***6(6,9,0)***

This initial stage of the course is designed to give the students a strong foundation in the language, improving their command of English as well as improving their vocabulary, reading, writing and communication skills. In the process of improving these skills, students will also develop their confidence in the language and also their presentation skills. These all contribute to the life skills of the student and help to prepare them for their future studies and careers beyond KSU. As the course progresses and students reach a higher level of English, the focus will switch to the academic side of the language. This will involve preparing students for the style of language they will need for their future studies.

Pre-requisites: None.

MATH 101: Differential Calculus ***3(3,1,0)***

Limits and Continuity: The Concept of Limit, Computation of Limits, Continuity and its Consequences, Limits Involving Infinity, Formal Definition of the Limit. Differentiation: The Concept of Derivative, Computation of Derivatives (The Power Rule, Higher Order Derivatives, and Acceleration), the Product and Quotient Rules, The Chain Rule, Derivatives of Exponential and Logarithmic Functions, Implicit Differentiation and Inverse Trigonometric Functions, the Mean Value Theorem. Applications of Differentiation: Indeterminate Forms and L'Hopital's rule, Maximum and Minimum Values, Increasing and Decreasing Functions, Concavity and the Second Derivative Test, Optimization, Related Rates.

Textbook: Robert T. Smith, and Roland R. Minton, "Calculus, early Transcendental functions", Third Edition, 2007.

Pre-requisite: None

ENT 101 Entrepreneurship ***1(1,0,0)***

Pre-requisites: None

CHEM 101: General Chemistry

Stoichiometry: SI Units, chemical formulas, the mole, methods of expressing concentration, Calculations based on chemical equations. Gases: laws, kinetic theory, deviation and van der Waals equation. Thermochemistry: Types of enthalpy changes, Hess Law and its applications,, first law of thermodynamics. Solutions: Type of solutions and laws related , colligative properties. Chemical kinetics: Law of reaction rate, reaction order, factors affecting the rates. Chemical Equilibrium : Relation between Kc & Kp, Le Chatelier's principle and factor affecting equilibrium. Ionic equilibrium: Acid and base concepts, pH calculations of acid, base and buffer solutions. Atomic Structure: emission spectrum, Bohr's theory de Broglre's hypothesis, quantum numbers, electronic configuration of elements, consequences of the periodic table.

Pre-requisites: None.

ARAB 100: Writing Skills ***2(2,0,0)***

ENGS 110: English ***6(6,9,0)***

The final assessment for the course is the highly regarded International English Language Testing System (IELTS), which is used as a qualifying test for students wishing

to attend university in many countries including the UK and Australia. Specialist material will be used to prepare students for this test with the aim of reaching an IELTS score of 5.0 by the end of the year.
Pre-requisites: None.

CUR 101: University skills ***3(3,0,0)***

Learning skills**:** Self-management for learning, learning tools, Reading strategies, Second language learning skills, Test administration.
Thinking skills: Theory of Inventive Problem Solving (TRIZ), Rounding Thinking, Expanding perception, Creative thinking. Research skills: Problem determining, Search for information strategies, Sites of sources, access this information, Using thin formation, Information construction, Information evaluation.
Pre-requisites: None.

CT 101: IT skills ***3(0,0,6)***

Basic Concepts of Information Technology, Using a computer and Managing Files, Word Processing, Spreadsheets, Databases, Presentation.
Pre-requisites: None.

STAT 101: Introduction to Statistics ***3(3,0,0)***

Descriptive statistics; Probability; Random variables and probability distribution functions; Statistical inference; Correlation and simple linear regression.
Pre-requisites: None.

EPH 101: Health and Fitness ***1(1-1-0)***

Subjects about general health and body and brain fitness.
Pre-requisites: None.

University Requirements

IC 100 - Studies in Prophet Biography	***2(2,0,0)***
IC 101 - Origins of Islamic Culture	***2(2,0,0)***
IC 102 - Family in Islam	***2(2,0,0)***
IC 103 - The Economic System in Islam	***2(2,0,0)***
IC 104 - The Political System in Islam	***2(2,0,0)***
IC 105 - Human Rights	***2(2,0,0)***
IC 106 - Medical Jurisprudence	***2(2,0,0)***
IC 107 – Professional Ethics	***2(2,0,0)***
IC 108 - Contemporary Issues	***2(2,0,0)***
IC 109 - Role of Women in Development	***2(2,0,0)***

College Requirements

A- Compulsory courses

MATH 106: Integral Calculus ***3(3,2,0)***

The definite integral, fundamental theorem of calculus, the indefinite integral, change of variable, numerical integration. Area, volume of revolution, work, arc length. Differentiation and integration of inverse trigonometric functions. The logarithmic,

exponential, hyperbolic and inverse hyperbolic functions. Techniques of integration: substitution, by parts, trigonometric substitutions, partial fractions, miscellaneous substitutions. Indeterminate forms, improper integrals. Polar coordinates.

Textbooks:
1- Robert T. Smith, and Roland R. Minton, "Calculus, early Transcendental functions", 3rd Edition.
2- Earl W. Swokowski, Michael Olinick, Dennis Pence, and Jeffery A. Cole "Calculus", 6th Edition.
Pre-requisite: MATH 101

MATH 107: Vectors and Matrices ***3(3,2,0)***

Vectors in two and three dimensions, scalar and vector products, equations of lines and planes in space, surfaces, cylindrical and spherical coordinates. Vector valued functions, their limits, continuity, derivatives and integrals. Motion of a particle in space, tangential and normal components of acceleration. Functions in two or three variables, their limits, continuity, partial derivatives, differentials, chain rule, directional derivatives, tangent planes and normal lines to surfaces. Extrema of functions of several variables, Lagrange multipliers. Systems of linear equations, matrices, determinants, inverse of a matrix, Cramer's rule.
Textbook: Edward and Penny, "Calculus", international edition.
Pre-requisite: MATH 101

MATH 203: Differential & Integral Calculus ***3(3,2,0)***

Infinite series, convergence and divergence of infinite series, integral test, ratio test, root test and comparison test. Conditional convergence and absolute convergence, alternating series test. Power series, Taylor and Maclaurin series. Double integral and its applications to area, volume, moments and centre of mass. Double integrals in polar coordinates. Triple integral in rectangular, cylindrical and spherical coordinates and applications to volume moment and centre of mass. Vector fields, line integrals, surface integrals, Green's theorem, the divergence theorem, Stoke' theorem.
Textbook:
1- Robert T. Smith, and Roland R. Minton, "Calculus, early Transcendental functions", 3rd Edition.
2- Earl W. Swokowski, Michael Olinick, Dennis Pence, and Jeffery A. Cole "Calculus", 6th Edition.
Pre-requisite: MATH 106 and MATH 107

MATH 204: Differential Equations ***3(3,2,0)***

Various types of first order equations and their applications. Linear equations of higher order. Systems of linear equations with constant coefficients, reduction of order. Power series methods for solving second order equations with polynomial coefficients. Fourier series, Fourier series for even and odd functions. Complex Fourier series. The Fourier integral.
Textbook: Dennis G. Zill and Michael R Cullen, "Differential equations with boundary value problems", 6th edition
Pre-requisite: MATH 203

PHYS 103: General Physics (1) ***4(3,0,2)***

Introduction (Vectors), Motion in one dimension with constant acceleration, Motion in two dimensions with application to projectile motion and circular motion, Newton's Laws of Motion, Work and Energy, Potential Energy and law of conservation of Energy, Linear Momentum and Collisions, Rotation of rigid object about a fixed axis.
Pre-requisites: None.

PHYS 104: General Physics (2) ***4(3,0,2)***

Electricity and Magnetism: Coulomb's law, electric fields, Gauss' Law, electric potential, potential energy, capacitance and dielectric, currents and resistance, electrical energy and power, direct current circuits, Kirchhoffs rules, magnetic fields, motion of charged particle in a magnetic field, sources of the magnetic field, Ampere's law, Faraday's law of induction, self-inductance, energy in a magnetic field, mutual inductance, alternating current circuits, the RLC series circuit, power in an A.C. circuit, resonance in RLC services circuit.
Pre-requisites: PHYS 103

ENGL 109 – Language and Communication ***2(2,1,0)***

ENGL 109 includes *English for Specific Purpose* (ESP) units that cover terminology and expressions, in various engineering disciplines. The course is designed to improve the communication and reading skills of engineering students. It equips the student with essential linguistic expertise for his engineering study and prospective professional career.
Textbook: Eric H. Glendinning & Norman Glendinning, "Oxford English for Electrical and mechanical Engineering", Oxford University Press (2000).
Pre-requisites: None.

ENGL 110 – Technical Writing ***2(2,1,0)***

English 110 is intended to enhance technical writing skills. It equips students with writing basics and techniques required for constructing clear and persuasive presentation of their ideas, on various forms including reports, presentations, worksheets, CVs' and memos. The course highlights effective writing features including: focus, organization, support & elaboration, style, and conventions. It emphasizes on observing ethical norms in writing.
Textbook: Daphne Mackey, "Send me a Message: *A step-by-step approach to business and professional writing*", McGraw Hill (2006); Pre-requisites: ENGL 109.

GE 104: Basics of Engineering Drawing ***3(2,0,2)***

The course includes the drawing of Orthographic and isometric projections. Other topics include scaling, sectioning, dimensioning and blue print reading. The course is taught using free hand, AutoCAD and AutoDesk Invetor.
Textbook: Fundamentals of Graphics Communication, Bertoline, G.R., And Weibe, E.N., Mc Grew-Hill Inc., New York, 5th edition, 2007
References:
1- A Manual of Engineering Drawing Practice, C.H. Simons and D.E. Maguire, Hodder & Stoughton.
2- Engineering Drawing and Graphic Technology, French T. E., Charles J. V. and Foster R.J., 14th Edition, McGraw-Hill,1993. Pre-requisites: None.

GE 106: Introduction to Engineering Design ***3(2,1,2)***

Engineering profession, jobs, and disciplines; Elements of engineering analysis; Introduction to engineering design and team formation; Engineering problem definition; Engineering system Architecture and physical function decomposition; human factor, environment, and safety issues in design; Generation of alternative concepts; Evaluation of alternatives and selection of a concept, Design defense, performance evaluation, and reporting; Engineering ethics.

Textbook: Philip Kosky, Robert T. Balmer, William D. Keat, George Wise, Exploring Engineering: An Introduction to Engineering and design, 4th ed.

Pre-requisite: GE 104

GE 201: Statics ***3(3,1,0)***

Force systems; vector analysis, moments and couples in 2D and 3D. Equilibrium of force systems. Analysis of structures; plane trusses and frames. Distributed force system; centroid of simple and composite bodies. Area moments of inertia. Analysis of beams. Friction.

Textbook: Meriam, J. L. and Kraige, L. G. "Engineering Mechanics, Volume 1, Statics", SI units Version

Pre-requisite: MATH 106 & MATH 107

GE 203: Engineering and Environment ***2(2,0,0)***

This course introduces the impact of engineering and industrial activities on the environment. The lectures cover basics of ecosystems, environmental balance, types of pollution, and types, sources, and limits of pollutants; in addition to fundamentals of Environmental Impact Assessment (EIA). Pollution control technologies and examples of pollution from various engineering and industrial sectors are also covered.

Textbook: G. Tyler Miller, Scott Spoolman. Living in the Environment, 17th edition. Cengage Learning (2014)

Jerry A. Nathanson, Richard A. Schneider. Basic Environmental Technology: Water Supply, Waste Management, and Pollution Control, 6th edition. Pearson Education, Limited (2014)

Pre-requisite: CHEM 101, MATH 101

GE 402: Engineering Projects Management ***3(3,1,0)***

This course introduces techniques that provide rational solutions to a range of project management decisions encountered in engineering projects. Students are expected to gain a detailed understanding of some of the techniques, tools and processes available and their application in starting, planning, managing and finishing engineering projects; The course covers project management fundamentals including projects life cycle, project planning and scheduling techniques, cash flow forecasting, performance evaluations, estimating and cost control; project organizations; Introduction to risk management.

Textbook: Meredith, J. R., Mantel Jr, S. J., & Shafer, S. M. (2013). Project management in practice. Wiley Global Education

GE 403: Engineering Economy ***2(2,1,0)***

This course is being offered to the students who enroll in the College of Engineering to give them fundamental knowledge and understandings on Cost concepts, Time value of money operations, Measuring the worth of investments, Comparison of alternatives, Depreciation, and Economic analysis of public projects

Textbook: John A. White, Kenneth E. Case and David B. Pratt, "Principles of engineering economic analyses", 5th edition.

Pre-requisites: None.

B- Additional courses

GE 209: Computer Programming ***3(2,0,2)***

To introduce computer programming for solving engineering problems in MATLAB environment

Textbook: MATLAB for Engineers by Holly Moore, Pearson; 5th edition (2017).

Pre-requisites: None.

MATH 254: Numerical Methods ***3(3,2,0)***

Various numerical methods for solving nonlinear equations. Direct and iterative methods for solving systems of linear equations along with error estimate. Polynomial interpolation with error formula. Numerical differentiation and integration with error terms. An introduction to numerical solution of ordinary differential equations.

Textbook: Rizwan Butt and Yacine Benhadid, "An Introduction to Numerical Analysis"

Pre-requisite: MATH 107

Department Requirements

A-core courses

PGE 251 - Introduction to Petroleum and Natural Gas Engineering 2(2-1-0)

The importance and history of petroleum and natural gas. Origin, formation, migration and accumulation of petroleum and natural gas. Introduction to chemistry of petroleum. Classification of petroleum and natural gas. Introduction to petroleum and natural gas reservoirs geology, rocks and fluids properties. Introduction to petroleum and natural gas exploration and well drilling engineering. Introduction to natural gas engineering. Petroleum and natural gas reserves estimation. Introduction to petroleum production engineering, transportation and refining of petroleum. Offshore pollution by petroleum.

Pre-requisites: None

PGE 361 - Reservoir Rock Properties and Fluid Flow ***2(2-1-0)***

Porosity, Permeability, Fluid flow in porous media, Fluid saturations, Capillary pressure, Wettability, surface tension, Relative permeabilities.

Pre-requisites: PGE251

PGE 362 - Reservoir Fluid Properties ***2(2-1-0)***

Properties of gases, Phase behavior of liquids, Qualitative phase behavior of hydrocarbon systems, Quantitative phase behavior, Reservoir fluid characteristics.

Pre-requisites: PGE251

PGE 363 - Reservoir Engineering Laboratory 2(1-0-2)

Firstly: Determinations of physical properties of reservoir rock: absolute and effective porosity, gas and liquid permeability and Klinkenberg effect, capillary pressure curves and pore size distribution, fluid saturation. Secondly: measurements of PVT characteristics of reservoir fluids: bubble-point pressure, oil formation volume factor, gas solubility, gas formation volume factor and compressibility factor, oil, gas and water viscosities.

Co-requisites: PGE361 and PGE362

PGE 366 - Natural Gas Reservoir Engineering 2(2-1-0)

Introduction to natural gas. Physical properties of natural gases. Types of natural gas. Characteristics of gas and gas-condensate reservoirs. Estimation of gas reserves (for normally and abnormally pressured) using different forms of the general material balance equation. Prediction of gas reservoir performance subjected to water drive. Derivation of the basic flow equations for real gas and their solutions in terms of pressure, pressure squared and pseudo function and applications for analyzing gas well testing design and analysis. Production forecasting and decline curve analysis. Gas field development including reservoir deliverability.

Pre-requisites: PGE362 and PGE363

PGE 391 – Geologic Principles of Petroleum & Natural Gas Exploration 3(3-1-0)

Structure of the earth: (plate tectonics, depositional basins). Geological time (relative time, absolute time, stratigraphic classifications). Rocks and minerals: (minerals identification, rocks classification, rock cycle). Land and marine erosion and deposition. The subsurface environment: (subsurface waters, earth pressures, earth temperatures, impact on hydrocarbon exploration). Structural geology: (factors controlling behavior of materials, reservoir traps, folds: types, recognition and causes, faults: types and recognition, salt domes: origin and structural evolution). Examples of Saudi Aramco oil field geology: (introduction, total petroleum systems in Ghawwar field). Geological maps: (structure contours, isopach maps, cross-sections, measurements of strike and dip).

Pre-requisites: PGE251

PGE 450 – Seminar 2(1-2-0)

This course provides assistance to students to improve their oral presentation skills through, material preparation, proper training, and sufficient presentation practice. The students will attend professional seminars delivered by the department staff and distinguished speakers for the oil industry. Also, in this course students will learn the guidelines of technical reports writing in the field of petroleum engineering.

Co-requisites: PGE496

PGE 455 - Transportation & Storage of Petroleum and Natural Gas 2(2-1-0)

Single phase flow equations, friction factor, increasing the capacity of the pipelines, hydraulic gradient for pipelines, selecting the booster pump stations, storage tanks (types, design calculations, testing, gauging, and corrosion control), the components of underground gas storage, characteristics of underground storage.

Pre-requisites: PGE481

PGE 457 - Computer Applications in Petroleum and Natural Gas Engineering 2(1-2-0)

Computing techniques emphasizing solution to problems encountered in higher-level courses of petroleum and natural gas engineering.
Pre-requisites: PGE460 and PGE366

PGE 460 - Petroleum Reservoir Engineering 3(3-1-0)

Classification of reservoirs, oil in place, recovery factor, the material balance equation for oil reservoirs, performance prediction techniques, water influx calculations.
Pre-requisites: PGE362 and PGE363

PGE 464- Improved Oil Recovery 3(3-1-0)

Fractional flow, displacement mechanisms, flood patterns, displacement and areal sweep efficiency, peripheral and all pattern flooding, the effect of gas saturation on flooding performance, calculation of injection rate at the water flooding stages, displacement in stratified reservoirs, calculation of the vertical sweep efficiency by different models, calculations of the reservoir performance by using Dykstra-Parsons model, CGM model, water treatment and preparation for water-flooding applications, improved water flooding by chemical and thermal methods.
Pre-requisites: PGE460

PGE 467 - Reservoir Simulation 3(3-1-0)

Overview of reservoir simulation. Introduction to elementary mathematics. Properties of reservoir rocks and fluids, Rock-Fluid interaction properties. Reservoir Flow Equations: Single phase and multi-phase flow in porous media (incompressible and compressible). Finite Difference Approximations for one, two and three-dimensional reservoirs, Crank-Nicholson method, Thomas' algorithm. Solutions of systems of linear equations. Applications using a black oil simulator.
Pre-requisites: PGE460 and Math 204

PGE 471 - Drilling Engineering -1- 2 (2-1-0)

System of units, calculation of pressure and temperature gradients. Rotary drilling, rig components, well planning, Drill string design of conventional drilling, stress analyses (yield strength, collapse and burst calculations and biaxial stresses. Hoisting system, draw-works, blocks, drilling lines, ton-mile calculation and design factor. Drilling tools, Bit design and selection. Drilling fluids, mud types, functions, Circulating system hydraulics, pressure losses and optimization of bit hydraulics.
Co-requisites: PGE490

PGE 474 - Drilling Engineering -2- 3(3-1-0)

Types, origins and methods of estimating pore pressure, formation fracture pressure and methods of its calculations, types, selection, and calculations of drilling fluids, casing seat selection, casing design, cementing, well completion, factors affecting rate of penetration, hole problems, fishing, basics of directional drilling, rig contracts.
Pre-requisites: PGE471 and Co-requisites: PGE494

PGE 476- Drilling Engineering Laboratory ***2(1-0-2)***

For Drilling Fluids: density, viscosity, gel strength, filtration, HPHT filter loss, lubricity, solids content, oil content, sand content, pH and filtrate chemical analysis. For Cement: density, viscosity, filtration, thickening time, setting time, and compressive strength.

Pre-requisites: PGE474

PGE 478 - Directional and Horizontal Drilling and Well Control ***3(3-1-0)***

Introduction to directional drilling. Steps in designing well profile (kick-off point and build-up rate), Directional planning (purpose, considerations and calculations). Kick-off tools (purposes and functions), Horizontal drilling (design of BHA, max. dog-leg severity, fatigue, pipe sticking, miss target, etc.), Survey tools (MWD) and practices, well profile calculations, Well control, hydrostatic pressure vs. formation pressure, formation integrity test, and causes of underbalanced situations, Kick causes, detection and warning signs, shut-In procedures and collection of data, Calculating drill string and annular volume, kill methods, Well control equipment, Ram-type blowout preventer.

Pre-requisites: PGE474

PGE 481 - Production of Naturally Flowing Wells ***3(3-1-0)***

The performance of production formations. Factors influencing shape of IPR, Vertical lift performance, Flow of single and multiphase fluid flow in vertical pipes (Poettman, Gilbert, Hagedorn and Brown), Choke performance, The principles of gas lift, Production decline analysis using exponential, harmonic, and hyperbolic decline curves, Well-head equipment.

Pre-requisites: PGE471

PGE 482 - Artificial Lift Methods and Surface Operations ***2(2-1-0)***

Surface operations: Oil and gas gathering at oil fields, Oil and gas separators, Dehydration, desalting and stabilization, Heater theater design, Artificial lift methods: introduction, sucker rod pumping, Hydraulic pumping, Electric submergible centrifugal pumps, Gas lift valves and string design, Introduction to other artificial lift methods.

Pre-requisites: PGE481

PGE 484 - Natural Gas Production Engineering ***3(3-1-0)***

Introduction to gas properties. Gas reservoir performance: well deliverability tests, transient testing, and reservoir limit test, well completion effect on gas reservoir performance. Piping system performance: flow equations, and flow in pipelines. Gas compression: types and design of compressors. Total system analysis: tubing and flow line size, separator pressure effect, subsurface safety valve selection, separator pressure effect, and gas condensate reservoir. Field operation problems and gas processing. Gas measurement systems.

Pre-requisites: PGE366

PGE 485 - Petroleum Production Engineering Laboratory 2(1-0-2)

A laboratory study of certain basic ASTM petroleum tests; distillation, flash point, pour point, vapor pressure, cloud point, viscosity, specific gravity, water content and sediments, and salt content of crude oil.

Co-requisites: PGE481

PGE 486 – Well Stimulation and Sand Production Management 3(3-1-0)

Well stimulation by hydraulic fracturing: mechanics of fracturing, fracturing fluids and additives. Frac job design, Propping the fracture, Acidizing: acid types and reactions, Carbonate and sandstone acidizing techniques, Causes of sand production and methods of control, Gravel-pack design criteria, Nodal analysis applied to gravel-packed wells, Production of horizontal wells.

Pre-requisites: PGE482

PGE 490 - Petroleum and Natural Gas Exploration -1- 3(3-1-0)

Origin of petroleum: (source rocks, kerogen formation and maturation, estimation of generated petroleum), Petroleum migration: (expulsion and accumulation, different concepts), Petroleum reservoirs: (reservoir characteristics, parameters controlling the petroleum reservoirs), Oil in place and reserve calculation.

Pre-requisites: PGE391

PGE 491 - Petroleum and Natural Gas Economics 2(2-1-0)

History and legislations of oil in Saudi Arabia, Oil pricing methods, Economical resources, Swing producer, inflation, cartel and market clearing price, Historical data for oil prices development, OPEC, OAPEC and International Energy Agency, Basic engineering economy terms, Simple and Complex interests, Nominal and Effective and combined interest rates, Deterioration and sinking fund factor, Screening yardsticks for economical projects: Formulas for continuous and lump sum flow of fund, Net present value, Rate of return, Accounting rate of return, Growth rate of return, Discounted and undiscounted Payout time, Profit-to-Investment ratio, Benefit-Cost ratio.

Co-requisites: PGE 496

PGE 492 - Well Logging 3(3-1-0)

Fundamentals, SP-log, electric resistivity logs, sonic log, density log, neutron log, radioactivity logs (natural and induced gamma ray, neutron), production logs (TDT, Temp., RFT), log interpretation.

Pre-requisites: PGE471

PGE 493 - Well Test Analysis 3(3-1-0)

Diffusivity equations, derivation and solutions, superposition pressure drawdown test analysis, transient and semi-steady state, variable rate tests, pressure buildup test analysis, average reservoir pressure, finite and infinite reservoirs, flow barriers, well interference, pulse testing, pressure analysis in anisotropic and fractured reservoirs.

Pre-requisites: PGE460

PGE 494 - Petroleum and Natural Gas Exploration -2- 2(2-1-0)

Geophysical methods: (surface and subsurface prospecting for oil and gas, geo-electrical surveying, seismic surveying, gravity surveying, basic principles, equipment,

data processing, analysis, geological interpretation and hydrocarbon traps detection). Remote sensing and geographic information systems: basic principles.
Pre-requisites: PGE490

PGE 496 - Graduation Project -1- ***2(2-0-0)***

The aim of this part (PGE 496) is to train students on how to solve a specific petroleum engineering problem considering all constrains mentioned in the program educational outcomes, i.e. performing a typical research. Enrolled students are divided into groups if possible (enough number of enrolled students), and then a special petroleum design problem is assigned for each group to be studied using theoretical and/or experimental approaches. Additionally, each group is requested to share their finding with the other groups, submit a full comprehensive report, and present and defend their work by the end of the semester. The grading system will be as follows: 40 points for the course work, and 60 points for the final report, oral presentation and defense (Q&A). A timetable is announced in the beginning of each semester showing supporting lectures schedules and reports submission dates. Student must attend at least 75% of the scheduled lectures, submit a final report approved by the advisor, and defend his work through an oral presentation; otherwise considered failed in the course and given a grade "F". Pre-requisite: Complete successfully 129 credits hours and passing all courses in levels 1-7.

PGE 497 - Graduation Project -2- ***2(2-0-0)***

A capstone design course (PGE 497) is to prepare students for engineering practice through a curriculum culminating in a major design experience based on the knowledge and skills acquired earlier course work and incorporating appropriate engineering standards and multiple realistic constraints. Groups of students are provided with real data from an oil or gas reservoir, similar to that which would be available to an operator prior to a development decision. Through this exercise, students gain valuable insight into the use of imperfect and incomplete data, to the integration of the various taught components of the course and to problems of group interaction. A typical design project includes several of the following components of petroleum engineering: geological and reservoir characterization, reserves estimation, reservoir modeling and simulation, drilling and well completion design, casing design, cement job design, production optimization, pipeline design, surface facilities design, economics and impact on society and environment. Students are grouped as follows:

- Group I: Geology and Formation Evaluation Requirements.
- Group II: Drilling Engineering Requirements.
- Group III: Production Engineering Requirements.
- Group IV: Reservoir Engineering Requirements.

Students have access to state-of-the-art computer technology, industry standard software, and SPE OnePetro (https://www.onepetro.org) database. Reports must be submitted according to the set time schedule.
Pre-requisite: PGE 496

PGE 998: Research Project ***0 (no-grade pass or fail)***

The course is designed to serve the research needs of the students. The course is not required for graduation; so students may opt to register it or otherwise. The consent of the faculty member with whom the student might work is essential. (this is an optional elective course with no credit hours: not required for the B.Sc. degree in PGE)
Pre-requisite: Successful completion of 129 credit hours.

PGE 999: Practical Training ***1 (no-grade pass or fail)***

Students in the department are required to complete a 10 weeks summer training requirement in an area related to Petroleum and Natural Gas Engineering. Prior to undertaking the summer training program, the student must obtain the approval of the department and he must have completed, successfully, at least 110 credit hours including the CFY (or 78 credit hours excluding the CFY). Students enrolling in the summer training program are not allowed to take simultaneously any course or projects.
Prerequisite: Successful completion of 110 credit hours

B- Courses from Other Engineering Departments

CHE 304 - Thermodynamics for Petroleum and Natural Gas Engineering Students 2(2-1-0)

Basic concepts of thermodynamics. Properties of pure substances. First law of thermodynamics for closed systems and for open systems. Second law of thermodynamics. Power cycles. Refrigeration.
Pre-requisites: None

CHE 312 - Momentum Transport Operations for Petr. and N. Gas Eng. Students 3(3-1-0)

Fluid statics. Fluid dynamics. Flow around submerged bodies. Flow through porous media. Flow in Fluidized beds. Flow metering devices. Pumps and Fluid moving machinery. Non-Newtonian fluids. Dimensional analysis. Piping design.
Pre-requisites: None

ME 340 - Mechanical Engineering for Petroleum and N. Gas Eng. Students 3(3-1-0)

Stress and strain; compatibility of displacement; mechanical properties of materials; generalized Hook's law; torsion of circular cross-sectional beams; the relation between load, shear force and bending moment; pure bending of beams; transverse shear; shear flow; combined loadings; analysis of plane stresses; stress transformation, Mohr's circle-plane stress; thin and thick walled pressure vessels; deflection of beams; buckling.
Pre-requisites: GE 201

MASTER OF SCIENCE PROGRAM

Petroleum and natural gas engineering involve the application of earth sciences and physical sciences to the evaluation and exploitation of natural hydrocarbon resources. In the practical field, the development of reservoirs under increasingly adverse conditions poses new engineering problems. This requires skilled engineers capable

of producing engineered solutions to current problems. It is clear that the future exploitation of oil reservoirs in Saudi Arabia, for a secondary and tertiary crop of oil, requires intensive research over a long period. This calls for a steady output of highly trained petroleum engineering graduates.

The graduate courses are planned to emphasize the type of subject matter that addresses the petroleum production problems in Saudi Arabia. Additional courses may be added as the program progress. These include future courses on drilling, natural gas storage and utilization, and well logging. The program maintains a balance between the basic state–of–the–art technology and the particular needs of Saudi Arabia.

ADMISSION REQUIREMENTS

- ✓ Applicants for the Master's degree must hold the Bachelor of Science (B.Sc.) degree from King Saud University or an equivalent degree from another accredited university with the minimum grade of "Very Good". It is possible, upon the recommendation of the departmental Council, the approval of the College of Engineering Council and the Dean of Graduate Studies, to provide a conditional acceptance to a student with the grade of "Good". The admission is considered final only after the student had completed two semesters and attained a grade point average not less than "Very Good".
- ✓ It is possible to accept students holding Bachelor of Science degrees in (Chemical, Electrical, and Mechanical) Engineering, Geophysics and Petroleum Geology branches. In this case, the department may require additional complementary courses which applicants must take and pass their exams with a minimum grade of "Very Good".
- ✓ Students will be enrolled on a full-time basis. Exceptions may be made for part-time upon the recommendation of the Department Council and with approval of the College Council and the College of Graduate Studies Council.

PROGRAM REQUIREMENTS

- ✓ 10 specialized mandatory units which are common for all three areas of specialization.
- ✓ 6 units of mathematics designated by the Department Council, for each accepted group of students, from the mathematical courses.
- ✓ 9 units in the area of his specialization determined by the Department Council, for each accepted group of students, from the group of specialized area courses.
- ✓ In addition, a thesis based on a research related to problems in the oil industry.

AREAS OF SPECIALIZATION

- ✓ Petroleum and Natural Gas Reservoir Engineering.
- ✓ Petroleum and Natural Gas Well Drilling Engineering.
- ✓ Petroleum and Natural Gas Production Engineering.

COURSES PLAN

Details of MSc courses plan in Petroleum & Natural Gas engineering are shown below:

Table 1: Mandatory Common Courses (10 credits)

Course No.	Course Name	Credit Hours
PGE 510	Theory of fluid flow through porous media	3
PGE 520	Advanced oil well drilling engineering	3
PGE 530	Advanced petroleum production engineering	3
PGE 546	Graduate seminar	1

Table 2: Mathematics Courses (6 credits)

Course No.	Course Name	Credit Hours
MATH 503	Probability and mathematical statistics	3
MATH 505	Numerical linear algebra	3
MATH 506	Ordinary and partial differential equations	3
MATH 507	Advanced operations research	3

Table 3: Track 1 - Petroleum and Natural Gas Reservoir Engineering (9 credits)

Course No.	Course Name	Credit Hours
PGE 512	Water flooding	3
PGE 513	Tertiary oil recovery	3
PGE 515	Reservoir simulator development	3
PGE 516	Advanced natural gas technology	3
PGE 518	Advanced well test analysis	3
PGE 543	Advanced petroleum economics	3
PGE 545	Advanced topics in petroleum engineering	3

Table 4: Track 2 - Petroleum and Natural Gas Production Engineering (9 credits)

Course No.	Course Name	Credit Hours
PGE 516	Advanced natural gas technology	3
PGE 531	Advances Well Stimulation Technology	3
PGE 532	Multiphase Flow in Conduits	3
PGE 542	Reservoir Evaluation	3
PGE 543	Advanced petroleum economics	3
PGE 545	Advanced topics in petroleum engineering	3

Table 5: Track 3 - Petroleum and Natural Gas Well Drilling Engineering (9 credits)

Course No.	Course Name	Credit Hours
PGE 521	Advanced drilling fluids engineering	3
PGE 531	Advanced well stimulation technology	3
PGE 541	Oil exploration	3
PGE 543	Advanced petroleum economics	3
PGE 544	Rock mechanics	3
PGE 545	Advanced topics in petroleum engineering	3

BRIEF DESCRIPTION OF COURSES

PGE 510 (Theory of Fluid Flow Through Porous Media), 3(3-0-0)

Development of basic equations of fluid flow (Continuity equation, energy equation, and Darcy's law) in Cartesian and polar coordinate systems for single phase and multiphase flow. Diffusivity equation for compressible and incompressible flow. Applications of fluid flow equations to various oil recovery processes. Solutions of the diffusivity equation and applications to transient analysis. Introduction to reservoir simulation.

PGE 512 (Water Flooding) 3(3-0-0)

Buckley-Leverett theory. Well patterns. Sweep efficiency and conformance. Cross flow. Approximate design methods. Surface equipment. Water treatment. Selective plugging and profile control.

PGE 513 (Tertiary Oil Recovery) 3(3-0-0)

Chemical flooding methods, using surfactants, polymer, carbon dioxide, caustic, etc. Theories of oil entrapment and mobilization. Basic equations, theories and models. State-of-the art and field experience. Economics.

PGE 515 (Reservoir Simulator Development) 3(3-0-0)

Finite difference schemes. Time and distance discretization. Stability criteria. Applications to petroleum reservoir flow equations: IMPES and simultaneous solution. Development of multi-dimensional, multi-phase reservoir simulator.

PGE 516 (Advanced Natural Gas Technology) 3(3-0-0)

Phase relations of natural gas systems (ternary diagrams). Mathematical representation of phase behaviour. Gas analysis by spectrometry and chromatography. Design of gas pipelines. Advanced technology of underground storage of natural gas.

PGE 518 (Advanced Well Test Analysis) 3(3-0-0)

The diffusivity equation, line source solution and applications, van Everdingen and Hurst solution, effect of skin and wellbore storage, finite reservoirs and shape factors, use of pressure derivatives in well test analysis, pulse testing, the use of nonlinear regression in well test analysis, well testing in horizontal wells.

PGE 520 (Advanced Oil Well Drilling Engineering) 3(3-0-0)

Drilling problems, blowout control, loss circulation, solid control equipment, prediction of fissures and vugs pressure, directional drilling, horizontal drilling, complete well planning, and corrosion problems in drilling engineering.

PGE 521 (Advanced Drilling Fluids Engineering) 3(3-0-0)

Equipment and procedures for evaluating drilling fluids performance, clay mineralogy and colloid chemistry of drilling fluids, rheology of drilling fluids, filtration properties of drilling fluids, surface chemistry of drilling fluids, drilling problems related to drilling fluids, completion, workover and packer fluids.

PGE 530 (Advanced Petroleum Production Engineering) 3(3-0-0)

Inflow performance relationships, reservoir considerations, in well completions, completion and workover fluids, vertical flow by intermittent slugs, problems in well analysis, surface and separation facilities for oil, water and gas, choice of optimal production system.

PGE 531 (Advanced Well Stimulation Technology) 3(3-0-0)

Acidizing and well stimulation. Well diagnosis and workover. Deformations and their effect on well productivity. Fracturing theory and applications.

PGE 532 (Multiphase Fluid Flow in Conduits) 3(3-0-0)

Introduction. Mathematical and physical bases for pressure loss calculations in multiphase flow. Vertical multiphase flow. Horizontal multiphase flow. Multiphase flow in inclined pipes, and in directionally drilled wells.

PGE 541 (Petroleum Exploration) 3(3-0-0)

Land and marine gravity, and land and airborne magnetometer surveys. Interpretation. Modern methods of seismic surveying and of data interpretation. Seismic maps and sections. Remote sensing.

PGE 542 (Reservoir Evaluation) 3(3-0-0)

Elements of evaluation and economic systems governing value. Reservoir tools and their use to determine value. Geological input to evaluation. Principles of risk and uncertainty.

PGE 543 (Advanced Petroleum Economics) 3(3-0-0)

Exhaustible and renewable energy sources, international oil and gas market, oil and gas supply and demand, oil and gas prices, energy modeling and forecasting, competition and switching between fuels, the role of strategic oil inventory, risk analysis and uncertainty.

PGE 544 (Rock Mechanics) 3(3-0-0)

Analysis of stress and infinitesimal strain, Rock mechanical properties, Rock failure criteria, Linear elasticity and deformation, pore fluid pressure and flow in rocks, Laboratory tests, Rock yielding, Effect of effective stress on rock permeability, Physico-chemical analysis of wellbore stability.

PGE 545 (Advanced Topics in Petroleum Engineering) 3(3-0-0)

The department will select a newly developing area in petroleum engineering for offering.

PGE 546 (Graduate Seminar) 1(1-0-0)

Each participating student will attend many seminars offered by the department and oil companies and will present two or three subjects in petroleum engineering and discussion will be initiated from the participating students, faculty members and audience.

CONTACT INFORMATION

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مقدمة

أنشىء قسم هندسة البترول والغاز الطبيعي في العام **1394** هـ الموافق **1973** م ، و هو أول قسم لهندسة البترول والغاز الطبيعي في المملكة العربية السعودية ومنطقة الخليج .وكان إنشاؤه استجابة طبيعية للحاجة الملحة لأعداد متزايدة من مهندسي البترول والغاز الطبيعي في بلد يوجد فيه أكبر مخزون بترولي يملكه بلد واحد على الكرة الأرضية حيث يقرب من ربع المخزون العالمي، ولهذا تظل صناعة البترول في المملكة هي الرائدة بين الصناعات الأخرى، ودورها يبقى الأكبر مساهمة في الناتج الاقتصادي السنوي . بعد أن يتأكد فريق الاستكشاف من وجود تكوينات جيولوجية حاوية للزيت أو الغاز يبدأ مهندسوا البترول والغاز الطبيعي في تصميم ووضع الخطة العامة لبرامج الحفر ثم دراسة مخزون المكامن البترولية والطرق المثلى لإنتاجها والتي تتيح استخلاص أكبر عائد من البترول أو الغاز بأقل تكلفة ممكنة وبأفضل الطرق وبدون إهدار طاقة المكمن مع الأخذ في الإعتبار الظروف الخاصة بكل مكمن .ويتعاون في ذلك مهندسوا الحفر والمكامن والإنتاج .ومن أجل هذا يجرى ربط العلوم الأساسية بالعلوم الهندسية التخصصية لتقديم برنامج متكامل يحصل الطالب بمقتضاه على شهادة البكالوريوس في هندسة البترول والغاز الطبيعي .يقدم القسم مقررات دراسية لنيل درجة البكالوريوس والماجستير في هندسة البترول والغاز الطبيعي . ويمكن للخريج العمل في شركات البترول والغاز الطبيعي بالإضافة إلى شركات الخدمات المساندة لصناعة البترول والغاز الطبيعي.

تشمل الدراسة التخصصية مواد أساسية وتطبيقية في هندسة مكامن البترول والغاز الطبيعي وهندسة الإنتاج وهندسة الحفر وهندسة نقل وتخزين البترول والغاز الطبيعي، كما تشمل الدراسة اقتصاديات البترول مع التركيز على البترول العربي بصفة خاصة، كذلك يهتم القسم باستخدام الحاسبات الإلكترونية في مجالات هندسة البترول والغاز الطبيعي حتى يمكن إعداد المهندس الخريج بصورة أكمل للمشاركة في عصر التقنية الحديثة، وقد روعي في المناهج إعطاء أهمية كبيرة للتدريب العملي سواء في معامل القسم أو في مختلف مجالات صناعة البترول والغاز الطبيعي. يعتلي مهندسي البترول و الغاز الطبيعي في المملكة قائمة الأمن الوظيفي المستقبلي بين التخصصات الهندسية الأخرى كافة حيث تستقطب شركات البترول والغاز الطبيعي العاملة في المملكة النصيب الأكبر من مهندسي البترول والغاز الطبيعي حديثي التخرج لتوفر المجال الرحب لممارسة ما تعلموه من علوم ومعرفة في الجامعات وكذلك لتوفر المزايا المالية وفرص الإبتعاث والتدريب التي قد لا تتوفر لدى جهات أخرى .كذلك فإن هناك الكثير من الجهات الحكومية المختلفة تستقطب سنوياً العديد من خريجي أقسام هندسة البترول والغاز الطبيعي .وأخيراً فالمجال واسع لمهندسي البترول والغاز الطبيعي من خلال شركات الخدمات المساندة لصناعة البترول والغاز الطبيعي حيث أن معظم الخدمات التي تقدمها الشركات هي في الواقع جزء لا يتجزأ من صناعة البترول والغاز الطبيعي.

الرؤية

- ✓ الإعتداد دوليا بالمكانة المرموقة لقسم هندسة البترول و الغاز الطبيعي بجامعة الملك سعود.

الرسالة

- ✓ تقديم برامج أكاديمية عالية الجودة بالإضافة الى النشاطات التدريبية والبحثية.
- ✓ تخريج طلاب ذوي مهارات عالية تمكنهم من المنافسة عالميا.
- ✓ جذب و تطوير أعضاء هيئة تدريس ذوي كفاءات عالية.

أهداف البرنامج التعليمية

- ✓ أن يكون خريجي القسم لديهم مهارات عالية للعمل في صناعة البترول و الغاز الطبيعي محليا و عالميا.
- ✓ أن يكون خريجي القسم لديهم القدرة على التطور و تقلد مناصب عليا.
- ✓ أن يكون خريجي القسم لديهم القدرة على متابعة الدراسات العليا للمشاركة في الأعمال الأكاديمية و البحث العلمي.

الدرجات العلمية المتاحة

تشمل الدرجات العملية التي يمنحها قسم هندسة البترول والغاز الطبيعي:

- ✓ درجة بكالوريوس العلوم في هندسة البترول والغاز الطبيعي.
- ✓ درجة ماجستير العلوم في هندسة البترول والغاز الطبيعي) تخصص هندسة حفر آبار البترول و الغاز الطبيعي.(
- ✓ درجة ماجستير العلوم في هندسة البترول والغاز الطبيعي) تخصص هندسة إنتاج البترول و الغاز الطبيعي.(
- ✓ درجة ماجستير العلوم في هندسة البترول والغاز الطبيعي) تخصص هندسة مكامن البترول و الغاز الطبيعي.(
- ✓ دكتوراه الفلسفة في هندسة البترول والغاز الطبيعي (تحت الإنشاء).
- ✓ دبلوم عالي في هندسة البترول والغاز الطبيعي (تحت الإنشاء).
- ✓ تخصص فرعي في هندسة مكامن البترول والغاز الطبيعي لطلاب التخصصات الهندسية الأخرى (تحت الإنشاء).
- ✓ تخصص فرعي في هندسة إنتاج البترول والغاز الطبيعي لطلاب التخصصات الهندسية الأخرى (تحت الإنشاء).
- ✓ تخصص فرعي في هندسة حفر آبار البترول والغاز الطبيعي لطلاب التخصصات الهندسية الأخرى (تحت الإنشاء)

جامعة الملك سعود
كلية الهندسة

قسم هندسة البترول والغاز الطبيعي

معتمد من الهيئة الوطنية للاعتماد الأكاديمي ومن هيئة الاعتماد الأكاديمي الأمريكية للهندسة والتكنولوجيا

ABET Engineering Accreditation Commission

إعتماد NCAAA

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