University of Basrah

College of Engineering

Petroleum Engineering Department

# Self-Assessment Report

***Petroleum Engineering Department***
***College of Engineering,***
***University of Basrah,***
***Basrah, Iraq***

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**2016 - 2017**

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# Chapter 0: Background

The department of Petroleum Engineering (PeE) was established in 2008 and started functioning on September 1, 2008 with an undergraduate program. By end of the academic year 2011-2012, B.Sc. degrees in petroleum engineering was awarded. In the future, the department will initiate its M.Sc. program.
The Quality Assurance Unit (QAU) prepared workshop, procedures and standards for self assessment of academic programs at the college of engineering. The self assessment document contains (8) criteria for self assessment. Each criterion is made up of several standards. The PeE is one of eight in the engineering college undergoing self assessment this year. The objectives of self assessment are to:

- Improve and maintain academic standards.
- Enhance students' learning.
- Verify that existing programs meet their objectives and institutional goals.
- Provide feedback for quality assurance of academic programs.
- Prepare the academic programs for accreditation.

A Program Self Assessment Team was formed to coordinate and prepare the self assessment report according to the guidelines provided by QAU. Faculty members in the department were informed about this process and its objectives were explained in one of the departmental meetings. The need of their involvement in this process was emphasized throughout this exercise. In particular the faculty feedback was sought regarding the department's mission, objectives and program outcomes. It was also emphasized that this program is neither an exercise of data collection nor a public relation document to enhance the department's image but rather an opportunity to identify areas where improvements can be made so that the department can achieve its mission of providing high quality education, research and community service. It is important to mention that many of the self assessment tools such as measurable objectives and program outcomes, questionnaires, alignment of courses with objectives, etc. were developed during this self assessment period. Therefore we are in fact laying the ground and developing the tools and procedures for better future assessments. This report contains six sections. The first section outlines PeE program, mission and objectives. The second section provides information about the curriculum design and its organization. Section three lists the laboratories and their related information

followed by student support and guidance. Sections four through six cover student support, process control, faculty, and institutional facilities & support.

The petroleum engineering department constitutes of:

1. The **chairman** of the department who manages the department's academic and administrative affairs, the **chairman administrative support staff** (chairman's reservist, assistant, and secretary).
2. The **department panel** which includes all of the faculty members of the department whose names are listed in **Table 0.1**.

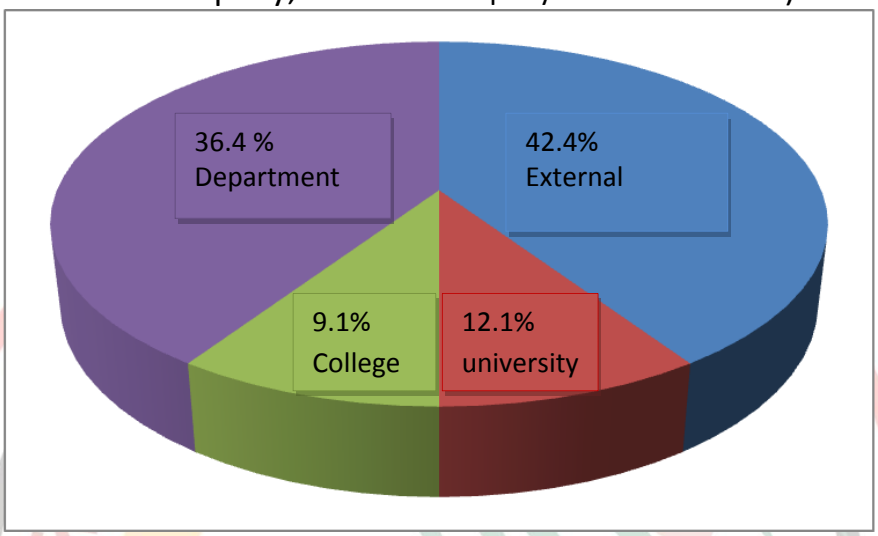
**Table 0.1: Petroleum Department Faculty Members**

| Rank | Full Name |
|---|---|
| Lecturer, PhD | Sajed Hussein Ali |
| Lecturer, PhD | Ammar Ali Ojimi |
| Lecturer, PhD | Hisham Kadhum Hashim |
| Lecturer, PhD | Ali Kamil Marzook |
| Lecturer | Salam Abd Alqader Falih |
| Lecturer | Amani Jalel Majeed |
| Assist. Lecturer | Ethar H. Khalil |
| Assist. Lecturer | Jasmin Fadhel Jassim |
| Assist. Lecturer | Hasanain Sami Abd Alhadi |
| Assist. Lecturer | Khawlah Naeem Hammood |
| Assist. Lecturer | Noor Hatem Obais |
| Assist. Lecturer | Nuhad Abd Al-Sada Taha |
| Assist. Lecturer | Ahmeed Khedeer Ahmeed |

The department faculty members teach only 13/33 courses which are 39.4 % of the four years courses and the rest are covered as follows and as shown in **Figure 0.1A and B**:

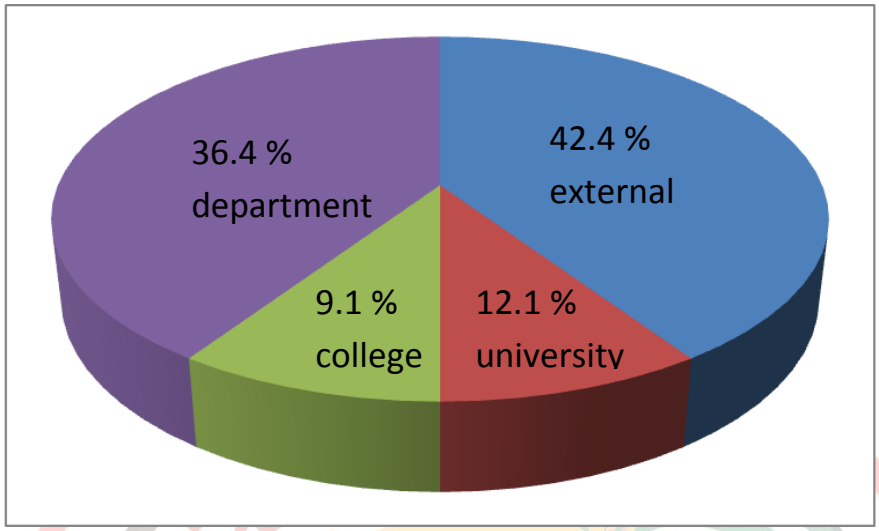
- 9.1 % (3/33) are the college staff (Chemical and civil).
- 12.1 % (4/33) are the University of Basrah staff (Law College, college of science, Economy and Management Colleges).

- 24.2 % (8/33) are external instructors of other university staff (Masan university)
- 18.2 % (6/33) are external instructors (South Oil Company, South Refineries Company, The state company for Iron and steel).




For the second semester

- 9.1 % (3/33) are the college staff (Chemical and civil).
- 12.1 % (4/33) are the University of Basrah staff (Law College, college of science, Economy and Management Colleges).
- 15.2 % (5/33) are external instructors of other university staff( Masan university)
- 27.3 % (9/33) are external instructors (South Oil Company, South Refineries Company, The state company for Iron and steel).




3. The department also has engineers, technicians, and administrators employees with their names mentioned in **Table0.2**.

**Table0.2: Engineers, Technicians, and administrators in Petroleum Eng. dept.**

| Name | Position and Specialty |
|---|---|
| Zahraa Sajid | Engineer – B.Sc. Energy Engineering |
| Massara Ali | Engineer – B.Sc. Petroleum Eng. |
| Noor K. Naeem | Engineer – B.Sc. Energy Engineering |
| Hadeel Rabeea | Biology – B.Sc. science |
| Lames Huss'am Ganam | Secretary |
| Intisar A. Jasim | Library Responsible |
| Abase Saedoon | Assist. Secretary |
| Mohammed Abed Al-Kareem | Assist. Secretary |
| Sammia J. Alwan | Service |

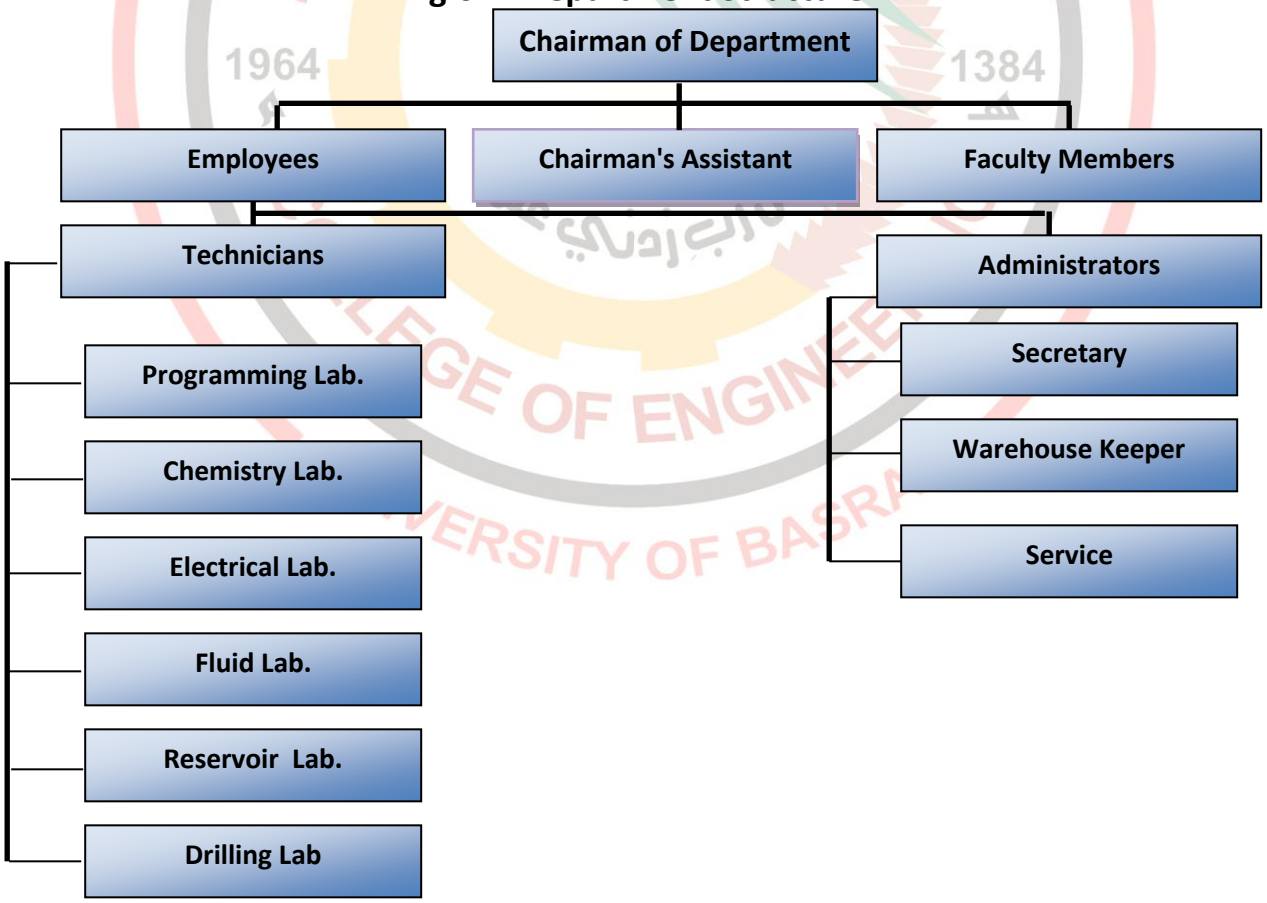
4. The department also has several committees, see **Table0.3**.

**Table 0.3: Departmental Committees**

| Committee Name |
|---|
| Scientific and Graduate Affairs Committee |
| Examination Committee |
| Importation Committee |
| Inventory Committee |
| Gratis Books Committee |
| Summer Industrial Training Committee |
| Laboratories Maintenance Committee |
| Quality Assurance Committee |
| Register of Students Committee |
| Computer Lab Committee |
| The Absent Students |
| The Test Committee |
| committee moderate prices |
| Commission on purchases |

In this way, the overall department structure is shown in **Fig.0.2**:

**Fig.0.2: Department Structure**



## Geology Lab

Doing a SWOT analysis for this section, we get:

| | Helpful (to achieving the objective) | Harmful (to achieving the objective) |
|---|---|---|
| Internal origin (attributes of the department) | **Strengths**<br>- 46.1% of the faculty members are of academic title equal to a lecturer.<br>- The department has a communication with many different petroleum organizations such as The state company for Iron and steel, Masan university because of most of the instructors are from these organizations.<br>- There is a diversity in majors of the department staff | **Weaknesses**<br>- 53.9 % of the faculty members hold academic title of assistant lecturer.<br>- Only One technician is assigned to each lab; this makes it difficult for them to teach students and do the maintenance operations.<br>- The department has no buildings, and Lake in Academic /Admission staff.<br>- 41 % of the staff are externals (not from the university staff). |
| External origin (attributes of the environment) | **Opportunities**<br>- 55 % of the faculty members have the intention to pursue their PhD degree.<br>- The department has many Ph.D scholarships for the 2015-2016 academic year.<br>- PeE department got a lot of chances to train the faculty members and students inside (oil companies). | **Threats**<br>- The inability to employ new faculty members because of the tight laws and rules of the ministry. |

## Questions and Answers:

**1. What is the department's used strategy in teaching and scientific research?**

In teaching, the process starts when the chairman assigns each faculty member specific curriculum(s) to teach and gives her/his the syllabus and the textbook of the curriculum, which s/he should use in teaching, but s/he has the ability to use other references. From this moment, s/he will be fully responsible of teaching the curriculum to students, but s/he must still under the supervision of the department's who warns her/him if any dereliction occurs. During the year, we apply the system of courses for the first year, s/he must afford the examination committee with:

- 1st semester examination's questions and marks.
- Final examination set questions and marks.
- 2nd semester examination's questions and marks.
- Final examination set questions and marks.

During the year, For the other three stages, s/he must afford the examination committee with:

- 1st semester examination's questions and marks.
- 2nd semester examination's questions and marks.
- Final examination set questions and marks.

In doing researches, each faculty member is working alone on his own research and at the beginning of each academic year, the faculty members have to fill out a research accomplishment form that includes:

- Number of the recent published research papers and where they were published.
- Number of papers that are currently under completion and the percentage of their accomplishment.
- Number of future suggested papers.

Sometimes, the department does a research with governmental or private sector agencies. Here, a team is formed and a contract is made between the department and the agency.

**2. What are the factors that affect positively/negatively the success of the department?**

Three factors affect the success of the department:

- The chairman of the department and his active wise administration.
- The curricula that are taught to students.
- The employed faculty members, technicians, and other staff members.

**3. How is the administrative-work organized in the department?**

- The chairman of the department assigns the duties and jobs of every member in the department:
  - If the member is a faculty, then s/he will be fully responsible of her/his assigned curriculum, laboratories, involved committee(s), and the community services.
  - If the member is an administrative staff, s/he does what her/his work needs and gets back to the chairman with any questions and consultation.
- Any crucial decisions at the department must be made by the "department board" that includes all of the faculty members.
- Students' daily issues are the responsibility of the chairman assistant who communicates their issues to the chairman.

**4. What are the means of interaction/contacting in the department? What are the evidences? Can these means be improved?**

In the first time, there are two ways to contact the department: either via coming personally to the department or via using the mail. But in this year can be improved contacting in the department by puts a website with official emails for its employees rather than their personal ones.

**5. Are the roles of all of the department's staff and their main jobs understood clearly?**

Yes, there is a description of each job made by the ministry; the chairman, his assistant, secretaries, faculty, committees, and board all know exactly what to do.

**6. How is the administrative-work in the department compared to the administrate-work in the petroleum engineering departments worldwide?**

In the US and European academic engineering departments, a more authority is given to the chairman of the department such that s/he can proceed in a more active smooth way.

# Chapter1: Criterion1 (Students)

## 1.1 Admission Process and Enrollment

Students are admissible to the college of engineering according to a central admission process called (grades comparison) managed by the Iraqi Ministry of Higher Education and Scientific Research / Studies, Planning, and Prosecution Office / Central Admission Department. The accepted students are coming from:

1. High school graduates (scientific disciplines only).
2. Petroleum Training Institute graduates (only who are in top 10% rank).
3. Distinguished employees in governmental offices who are originally institutions graduates.

After the names of the accepted students are announced, the registration committee which contains at least ten members including the dean's assistant has only ten days to meet the accepted students and to register them at the college. They are distributed again according to their high school grades on the eight departments in the college (petroleum engineering, architecture engineering, computer engineering, civil engineering, electrical engineering, chemical engineering, mechanical engineering, and materials engineering).

For the Petroleum engineering department, the number of the newly enrolled students has changed through the past three years from 60 to 80 students as seen in **Table1.1**.

**Table 1.1: Records of Admissions Standards Applied over the Past 8 Years**

| Academic Year | Percentile Rank in Secondary School (% MIN) | Number of New Enrolled Students |
|---|---|---|
| **2016-2017** | 96.5% | 101 |
| **2015-2016** | 95.5% | 75 |
| **2014-2015** | 95.4% | 80 |
| **2013-2014** | 92.2 % | 69 |
| **2012-2013** | 92 % | 80 |
| **2011-2012** | 92.4 % | 65 |
| **2010-2011** | 90.8 % | 87 |
| **2009-2010** | 89.2 % | 71 |
| **2008-2009** | 88.1 % | 54 |

## 1.2 Evaluating Students' Performance

The students of college of engineering are evaluated using the following means:

1. For the first stage, daily, semester, and final exams.
2. For the other three stages, daily, monthly, semester, and final exams.
3. Their laboratories reports.
4. Assignments.
5. Senior year project.
6. Summer industrial training reports.

## 1.3 Advising and Guidance

During the past years, the petroleum engineering department as well as the college of engineering had an educational advising scheme where one or two advisors were assigned to give advice to one level of study (1st, 2nd, 3rd, or 4th) year.

Starting from the first year, the department and the college has the intention to apply a new scheme of advising with the following steps:

1. The chairman of the department distributes the students on the selected faculty members (advisors) such as each advisor is assigned a number of advisees from the same that the faculty member teaches. Each month the advisor meets her/his assigned advisees according to a pre-scheduled appointments.
2. Each advisor delivers her/his monthly report to the chairman who is responsible of arranging the work of the advisors and gives recommendations of solving any problems that may face both the advisors and the students.
3. These appointments can be classified as:

    a. Evaluation meeting: assess the student's readiness and abilities and accordingly determine the best advising approach to follow.
    b. Diagnostic meeting: usually is used to make tests and answering questions to reach an accurate diagnosis in order to lay out the work plan of advising.
    c. Guidance/Treatment meeting: where the treatment is applied according to the plan set in the previous meeting. This treatment depends a lot on the skills and abilities of the advisor.

## 1.4 Graduation Requirements

In the petroleum engineering department, the student has to complete 148 credit hours in order to get a Bachelor of Science degree; these credit hours are divided across four years of study as:

For the 1st year:
**1.** 0/38 credits (0%) are of Petroleum Engineering courses requirements.
**2.** 38/38 credits (100%) are of College courses requirements.
**3.** 0/38 credits (0%) are of university courses requirements.

For the 2nd year:
**1.** 4/40 credits (10%) are of Petroleum Engineering courses requirements.
**2.** 32/40 credits (80%) are of College courses requirements.
**3.** 4/40 credits (10%) are of university courses requirements.

For the 3rd year:

**1.** 24/36 credits (66.6%) are of Petroleum Engineering courses requirements.
**2.** 12/36 credits (33.3%) are of College courses requirements.
**3.** 0/36credits (0%) are of university courses requirements.

For the 4th year:

**1.** 34/34 credits (100%) are of Petroleum Engineering courses requirements.
**2.** 0/34 credits (0%) are of College courses requirements.
**3.** 0/34 credits (0%) are of university courses requirements.

**Overall percentile during four years:**

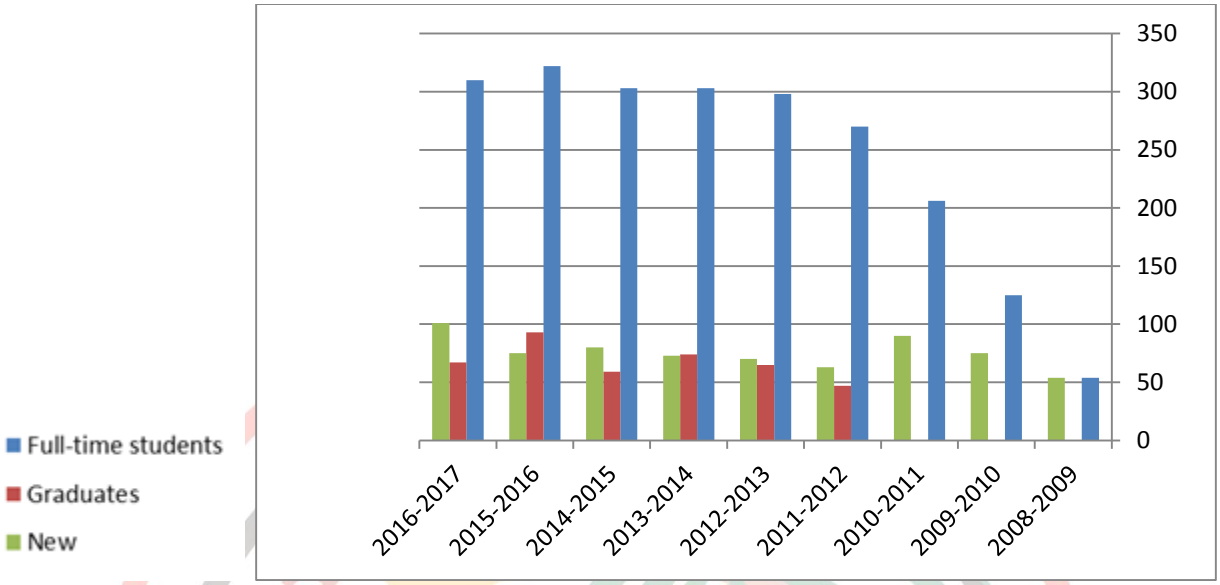
**1. 62/148 credits (41.8%) are of Petroleum Engineering courses requirements.**
**2. 82/148 credits (55.4%) are of College courses requirements.**
**3. 4/148 credits (2.7%) are of university courses requirements.**

**Table1.2** shows the records, over the past six academic years, of the total number of full time students enrolled in the program and the corresponding number of graduates each year.

**Table 1.4: Total enrollment and graduates trends for the past eight years**

| | 2016-2017 | 2015-2016 | 2014-2015 | 2013-2014 | 2012-2013 | 2011-2012 | 2010-2011 | 2009-2010 | 2008-2009 |
|---|---|---|---|---|---|---|---|---|---|
| **Full-time students** | 310 | 322 | 303 | 303 | 298 | 270 | 206 | 125 | 54 |
| **Graduates** | 67 | 93 | 59 | 74 | 65 | 47 | 0 | 0 | 0 |

**Fig.1.1** is a chart representation of the data tabulated in Table1.2; also it includes the number of the new students accepted in the department in each year.




## 1.5 Transfer Students

Each year, the Iraqi Ministry of Higher Education and Scientific Research issues the regulations of transferring succeeded students from/to all colleges and universities in Iraq. It also issues the nomination's modifications for the deferred and failed students. The college of engineering carries out the ministry instructions using a form given by the ministry plus other needed documents. The Students Affairs Department at the University of Basrah keeps following the transferring process that happens during summer holidays, i.e., July – August.

Each transferred student undergoes what is called the scientific reprise executed by the department if the curriculum and credit hours of the two colleges are similar in more than 80%. **Table1.5** shows the numbers of the transferred students from/to the department over the past eight years.

**Table1.5: The number of students transferred from/to the department over the last eight years**

| Academic Year | Number of Transferred Students | |
|---|---|---|
| | From the department | To the department |
| 2016-2017 | X | X |

| | | |
|---|---|---|
| 2015-2016 | X | X |
| 2014-2015 | X | X |
| 2013-2014 | 1 | 14 |
| 2012-2013 | 0 | 19 |
| 2011-2012 | 7 | 9 |
| 2010-2011 | 1 | 7 |
| 2009-2010 | N/A | 7 |
| 2008-2009 | N/A | 5 |

The SWOT analysis for this criterion is shown below:

| | Helpful (to achieving the objective) | Harmful (to achieving the objective) |
|---|---|---|
| Internal origin (attributes of the department) | **Strengths**<br>- Because of the high chance that a Petroleum engineer can get a job, the department accepts only those students of the highest-grade each year according the law of central admission.<br>- Many students do their summer training in a wellknown international oil companies such as Halliburton Schlemberger...etc<br>- | **Weaknesses**<br>- The increasing number of accepted students each year **REQUIRES** increasing in the faculty members, more wide classrooms, and other requirements.<br>- Almost 70 % of the final year projects' supervisors are external instructors. |
| External origin (attributes of the environment) | **Opportunities**<br>- The third stage has great chance to train in **Oil south company and Drilling Company and Waterford** oil companies which improve their technical and English skills.<br>- Ten students who are accepted in the first year do sign a contract with **South Oil Company**. | **Threats**<br>- Because of the large student's numbers compared with low faculty numbers, each education adviser has a (25-35) students to advice. This is very hard and difficult task according to the new scheme of advising.<br>- Increase the number of transferred students from/to the department which affects department plan of student acceptance. |

## Questions and Answers:

**1. How could the department be sure that the used teaching methods reinforce the students' learning? What are your evidences?**

The department has no tools to check the used teaching methods.

**2. What is the proof that the teaching process in the department is of a high quality? Does the department follow a mechanism in getting feedback from students about the teaching process? If yes, then what is the used mechanism? How does the department benefit from the gotten students' responses?**

We have no proof that the teaching process in the department is of a high quality, but last year, there was a survey distributed to students asking them about their opinion of each teacher and her/his teaching method.

**3. What do the used surveys, assessment criteria, and the students' gotten exams' results offer to the department?**

They offer a good feedback that helps in the process of updating the curricula and developing the laboratories.

**4. Do the examination process's assessment criteria fulfill the wanted teaching results? What are your evidences?**

Currently, there is no clear strategy to check that.

**5. Do the students be informed about the exams requirements at the beginning of every new academic year?**

Yes, they are informed at the beginning of each academic year about the exams.

**6. Is there an academic support or any other type of help for students to overcome their problems?**

According to the previous used advising method, there was not much understanding of the students' problems. With the new used advising scheme, students' academic problems as well as social ones are manageable.

**7. What are the used procedures in case of emergencies?**

There are not such procedures.

**8. <u>What are the good practices at the department and how to support/encourage them? Give your evidences. Are there proofs that the program is enhanced via the exchanging of these good practices?</u>**

Offering scientific visits for students to factories, companies, and other specialized agencies is a good practice at the department and it certainly enhances the program.

**9. <u>Do the department's basic statistics show:</u>**

**a. <u>The ratio of faculty members and their qualifications to students?</u>** Yes.

**b. <u>Admission qualifications and the ratio of girls to boys?</u>** Yes, in our statistics, we have exactly how many students are admitted to the department, how many of them are males and how many are females.

**c. <u>Number of received applications vs. actual admitted students' number?</u>**

Usually, the two numbers are equal unless some students decide to be transferred to other departments.

**d. <u>Succeeded-students rate and transferred students rate?</u>** Yes.

# Chapter 2: Criterion2 (Program Educational Objectives)

## 2.1 Vision of the Department

To be recognized as the top Petroleum Engineering education programs in Iraq: teaching, scientific research, and community service.

## 2.2 Mission of the Department

To have a high quality program that provides the student with basic petroleum engineering education as well as cultivating personal skills, ethical values, and awareness of industry needs.

## 2.3 Strategic Objectives of the Department

The broad education objectives of the undergraduate program in Petroleum Engineering are to provide a solid foundation of mathematical, scientific and engineering knowledge and to develop the basic engineering skills that will serve

students throughout their careers. Table2.1 shows the Petroleum Engineering Department Objectives.

**Table2.1: Program Education Objectives**

| | |
|---|---|
| **PEO1** | Identify and devise solution approaches to common Petroleum engineering problems allowing efficient exploitation of natural petroleum resources. |
| **PEO2** | Design and execute of experiments in the various areas of petroleum engineering. |
| **PEO3** | Acquire communication skills, critical team skills and leadership capabilities to be capable of keen on continuous professional development. |
| **PEO4** | Abide by professional and ethical standards and be committed to preserve the country. |

## 2.4 Consistency of the PEOs with the College Educational Objectives (CEOs)

The PEOs of PeE are coherent and in flow with those of the college of engineering. They are stated in accordance with the College Educational Objectives (**CEOs**); mentioned in **Table 2.2**, while preserving the unique characteristics of PeE.

**Table 2.2: College Education Objectives**

| | |
|---|---|
| **CEO1** | Prepare globally competent and socially responsible graduates who are specialists in engineering sciences and their applications by providing quality education. |
| **CEO2** | Encourage and support the higher degree graduate studies (master and doctorate) in all college departments. |
| **CEO3** | Foster research and scholarly endeavors that advance knowledge and help in solving the industrial and social problems. |
| **CEO4** | Contribute to the welfare of the country by establishing effective partnerships that can add value and contribute to college programs. |

| | |
|---|---|
| **CEO5** | Create an enriching supportive working environment for the college community to ensure the achievements of the college objectives. |

Table2.3 establishes the links between the PEOs of the department and the major components of the CEOs of both the college of engineering.

**Table2.3: Links between the PEOs of the Department and the CEOs of the College**

| Program Educational Objectives (PEOs) | | PEO1 | PEO2 | PEO3 | PEO4 |
|---|---|---|---|---|---|
| College of Engineering Objectives (CEOs) | CEO1 | X | X | X | X |
| | CEO2 | X | X | | |
| | CEO3 | X | | | |
| | CEO4 | X | | X | |
| | CEO5 | | X | X | X |

## 2.5 Program Outcomes

The main objective of the Program Outcomes, POs, and Program Educational Objectives PEOs, is to measure the level of achievement of the curricular requirement of the department in preparing the graduates to meet the challenges presented to them by the fascinating petroleum industry. In other words, petroleum engineering Program outcomes, POs, and Program Educational Objectives, PEOs, are two different, but interrelated mechanisms that were developed in order to measure the level of achievement and success of the program.

The PeE department has developed ten Program Outcomes (POs) as an initial set of POs. These outcomes are, in effect, what the students expected to know and achieve post graduation. **Table2.4** shows these program outcomes.

**Table2.4: Petroleum Engineering Program Outcomes**

| Symbol | Description |
|---|---|
| A | **PO1:** The curriculum must be consistent and support the program's documented objectives. |
| B | **PO2:** Theoretical background, problem analysis and solution design must be stressed within the program's core material. |
| C | **PO3:** The curriculum must satisfy the mathematics and basic sciences requirements for the program, as specified by the respective accreditation body. |
| D | **PO4:** The curriculum must satisfy the major requirements for the program as specified by the respective accreditation body. |
| E | **PO5:** ability to design an integrated system and its various components and processes, within realistic economic, environment, social, political, ethical, health and safety, manufacturability, and sustainability constraints. |
| F | **PO6:** understanding of the responsibility of engineers to practice in a professional and ethical manner at all times. |
| G | **PO7:** ability to communicate effectively using oral, written, and graphic forms. |
| H | **PO8:** The curriculum must satisfy humanities, social sciences, arts, ethical, professional and other discipline requirements for the program, as specified by the respective accreditation body. |
| I | **PO9:** Information technology component of the curriculum must be integrated throughout the program. |
| J | **PO10:** Oral and written communication skills of the student must be developed and applied in the program. |

## 2.6 Relationship of the Program Outcomes to the PEOs

Mapping between the Program Outcomes and the Program Educational Objectives is shown in Table2.5.

## Table2.5: Mapping of Program Outcomes to PEOs

| PEOs | | | | |
|---|---|---|---|---|
| **POs** | **PEO1** | **PEO2** | **PEO3** | **PEO4** |
| **PO-a** | X | | | |
| **PO-b** | X | X | X | |
| **PO-c** | X | X | X | |
| **PO-d** | X | X | | X |
| **PO-e** | X | | X | X |
| **PO-f** | X | X | | X |
| **PO-g** | X | X | | |
| **PO-h** | X | | X | X |
| **PO-i** | X | X | | |
| **PO-j** | X | X | | |

The SWOT analysis gives us:

| | Helpful (to achieving the objective) | Harmful (to achieving the objective) |
|---|---|---|
| Internal origin (attributes of the department) | **Strengths**<br>- The department vision, mission, and objectives focus on the graduates and the overall knowledge they get to apply in their future carrier.<br>- The department vision, mission, and objectives focus on the ethical communication and leadership skills. | **Weaknesses**<br>- CEO2 focus on the graduate studies, but unfortunately the department has no graduate studies program. |
| origin (attributes of the | **Opportunities**<br>- By reopening the graduate studies at the department, the weaknesses will be gotten rid of. | **Threats**<br>- The program outcomes (a,b,c,g,l,j) do not fully accomplish the PEO4 which focuses on the contributions of the graduates to the welfare of the society. |

# Chapter3: Criterion3 (Curriculum)

## 3.1 Curricular/Course Description

In Petroleum engineering department, each curricular is described by:

1. Curricular/Course Number and Title: each course is coded as:

**Course Number = PeE + X X X (3 Digits Number)**


For example: **PeE432 Drilling Engineering** means that this is a petroleum engineering department course that is given to the **fourth year**; it is the **second course** within the **department requirement** curriculum.

2. Required or elective: whether it is required course for the program or an elective one.
3. Course description: defines what the course is designed for and why it is given to the students.
4. Recommended Textbook(s): what the used textbook(s) or internet articles to teach this course.
5. Prerequisites (if any): these have been established to assure an adequate and uniform background for students in advanced classes.
6. Course Topics: detailed syllabus of the course.
7. Course Outcomes: they are the key points that the students have learned.

## 3.2 Graduation Requirements:

To graduate, students have to complete **148** credit hours during her/his four years study. **Fig.3.1** and **Table3.1** show the PeE curriculum requirements year by year.

University of Basrah

College of Engineering

Petroleum Engineering Department

## Fig.3.1: Roadmap to Graduation

| Year1 | Year2 | Year3 | Year4 |
|---|---|---|---|
| physics | Principles of Petroleum Engineering | Reservoir Engineering I | Reservoir Engineering II |
| Mathematics 1 | Mathematics 2 | Drilling Engineering I | Drilling Engineering II |
| General Geology | Fluids Mechanics | Petroleum Production Engineering I | Petroleum Production Engineering II |
| Engineering Drawing | Electrical Technology | Geophysics | Petroleum Project Management |
| Computer Programming 1 | Oil Properties | Pollution and Industrial Safety | Secondary Oil Recovery |
| General Chemistry | Mechanics of Material | Well Logging | Numerical Methods and Reservoir Simulation |
| Engineering Mechanics | Structural Geology | Thermodynamics | Gas Technology |
| English | Computer Programming 2 | Engineering Mathematics | Engineering Project |
| | Principles of human rights & Democracy / Freedom Concepts | Engineering Economics and Statistics | |

| University Requirements | College Requirements | Department Requirements |
|---|---|---|

## Table3.1: PeE Curriculum Requirements

| Total PeE Requirements: 148 credit hours / 33 courses | | | | | |
|---|---|---|---|---|---|
| **Requirements** | | **Credit Hours** | | | |
| University Requirements | | 4 | | | |
| College Requirements | | 75 | | | |
| Department Requirements | | 69 | | | |
| **Total** | | **148** | | | |
| **University Requirements: 4 credit hours / 1 course** | | | | | |
| **Course No.** | **Course Title** | **Credit Hours** | **Weekly Hours** | | |
| **PeE219** | **Principles of human rights &Democracy and Freedom Concepts** | **4** | **2** | | |
| | **Total** | **4** | **2** | | |
| **College Requirements: 82 credit Hours / 15 courses** | | | | | |
| **Course No.** | **Course Title** | **Credit Hours** | **Weekly Hours** | | |
| | | | **Lec.** | **Tut.** | **Lab.** |
| **PeE121** | **Mathematics 1** | **4** | **2** | **2** | **0** |
| **PeE122** | **General Geology** | **6** | **2** | **0** | **2** |
| **PeE123** | **Engineering Drawing & Descriptive Geometry** | **4** | **1** | **0** | **2** |
| **PeE124** | **Computer Programming 1** | **6** | **2** | **0** | **2** |
| **PeE125** | **General Chemistry** | **7** | **2** | **0** | **3** |
| **PeE126** | **Engineering Mechanics** | **7** | **3** | **1** | **1** |
| **PeE127** | **Physics** | **4** | **2** | **0** | **0** |
| **U111** | **English** | **2** | **2** | **0** | **0** |
| **PeE222** | **Mathematics 2** | **4** | **2** | **2** | **0** |
| **PeE223** | **Fluids Mechanics** | **6** | **2** | **0** | **2** |
| **PeE224** | **Electrical Technology (First Semester)** | **3** | **2** | **0** | **2** |
| **PeE226** | **Mechanics of Material** | **4** | **2** | **1** | **0** |
| **PeE227** | **Structural & Petroleum Geology** | **6** | **2** | **0** | **2** |

| | | | | | |
|---|---|---|---|---|---|
| PeE228 | Computer Programming 2 | 6 | 2 | 0 | 2 |
| PeE327 | Thermodynamics | 4 | 2 | 1 | 0 |
| PeE328 | Engineering Mathematics | 4 | 2 | 2 | 0 |
| | Total 15 course | 75 | 30 | 9 | 18 |

| Department Requirements: 62 credit hours / 17 courses | | | | | |
|---|---|---|---|---|---|
| Course No. | Course Title | Credit Hours | Weekly Hours | | |
| | | | Lec. | Tut. | Lab. |
| PeE231 | Principles of Petroleum Engineering | 4 | 2 | 2 | 0 |
| PeE235 | Petrol Properties (Second semester) | 3 | 2 | 0 | 2 |
| PeE331 | Reservoir Engineering I | 6 | 2 | 0 | 2 |
| PeE332 | Drilling Engineering I | 6 | 2 | 2 | 2 |
| PeE333 | Petroleum Production Engineering I | 4 | 2 | 1 | 0 |
| PeE334 | Geophysics (First semester) | 2 | 2 | 1 | 0 |
| PeE335 | Pollution and Industrial Safety (Second semester) | 2 | 2 | 1 | 0 |
| PeE336 | Well Logging | 4 | 2 | 2 | 0 |
| PeE339 | Engineering Economics and Statistics | 4 | 2 | 0 | 0 |
| PeE431 | Reservoir Engineering II | 4 | 2 | 2 | 0 |
| PeE432 | Drilling Engineering II | 4 | 2 | 2 | 0 |
| PeE433 | Petroleum Production Engineering II | 4 | 2 | 2 | 0 |
| PeE434 | Petroleum Project Management | 4 | 2 | 0 | 0 |
| PeE435 | Secondary Oil Recovery | 4 | 2 | 1 | 0 |
| PeE436 | Numerical Methods and Reservoir Simulation | 6 | 2 | 1 | 2 |
| PeE437 | Gas Technology | 4 | 2 | 0 | 0 |
| PeE438 | Engineering Project & Ethics | 4 | 1 | 0 | 2 |

| | | | | | |
|---|---|---|---|---|---|
| | **Total 17 course** | **69** | **33** | **17** | **10** |

## 3.3 Mapping of Course Learning Outcomes to Program Outcomes

An academic program is, in effect, the superposition of a set of courses, somehow, linked together to achieve program outcome. This means that courses in any academic program represent the building blocks of that program. Assessment of the program would only be possible if the course learning outcomes are mapped to the program outcomes. Course learning outcomes of individual program courses are listed in the detailed course syllabus which are prepared by faculty teaching that particular course and submitted to the student in the beginning of the year. Each year, immediately after tallying the final grades of all courses, mapping between the courses and program outcomes is also established. Mapping of all the courses offered by the PeE department is given below in **Table3.2**.

**Table3.2: Mapping of the PeE Core Courses to the Program Outcomes**

| Course No. | Course Title | Program Outcomes | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | A | B | C | D | E | F | G | H | I | J | K |
| **First Year** | | | | | | | | | | | | |
| **PeE121** | **Mathematics 1** | X | X | | | X | | X | X | | | |
| **PeE122** | **General Geology** | X | X | | | X | | X | X | X | X | X |
| **PeE123** | **Engineering Drawing & Descriptive Geometry** | X | X | X | | X | | | X | | | |
| **PeE124** | **Computer Programming 1** | X | X | X | | X | | X | X | | X | |
| **PeE125** | **General Chemistry** | | | | | | X | | X | | | |
| **PeE126** | **Engineering Mechanics** | | | | X | | | X | | X | | X |
| **PeE127** | **Physics** | | | | X | | | X | | | | X |
| **U111** | **English** | X | | | | X | | X | X | X | X | |
| **Second Year** | | | | | | | | | | | | |
| **PeE219** | **Democracy and Freedom Concepts** | X | | | | X | | X | X | X | X | |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **PeE222** | **Mathematics 2** | X | | | | X | | X | X | | X | |
| **PeE223** | **Fluids Mechanics** | | | X | | X | | X | | X | | X |
| **PeE224** | **Electrical Technology (1st Semester)** | X | | X | | X | | X | X | X | X | |
| **PeE226** | **Mechanics of Material** | X | X | X | | X | | X | X | | X | |
| **PeE227** | **Structural and Petroleum Geology** | X | | X | | X | | X | X | X | X | X |
| **PeE228** | **Computer Programming 2** | X | X | | | X | | X | X | X | X | X |
| **PeE231** | **Principles of Petroleum Engineering** | | | | | | X | | X | | | |
| **PeE235** | **Oil Properties (2nd semester)** | X | X | X | X | X | | X | X | X | X | X |
| **Third Year** | | | | | | | | | | | | |
| **PeE327** | **Thermodynamics** | X | X | | | X | | | X | | | |
| **PeE328** | **Engineering Mathmatics** | X | X | | | X | | | X | | | |
| **PeE331** | **Reservoir Engineering I** | | | X | | | X | X | X | X | | |
| **PeE332** | **Drilling Engineering I** | X | | X | | X | | X | X | X | X | |
| **PeE333** | **Petroleum Production Engineering I** | | | X | | | | X | X | X | X | X |
| **PeE334** | **Geophysics (1st semester)** | X | X | X | | X | | X | X | | X | |
| **PeE335** | **Pollution and Industrial Safety (2nd semester)** | X | | X | | X | | | X | | X | |
| **PeE329** | **Engineering Economy and statestics** | X | X | | | X | | | X | | | |
| **PeE336** | **Well Logging** | X | | X | | X | | X | X | X | X | X |
| **Fourth Year** | | | | | | | | | | | | |
| **PeE431** | **Reservoir Engineering II** | X | | X | | | X | X | X | X | | |
| **PeE432** | **Drilling Engineering II** | X | | X | | X | | X | X | X | X | X |
| **PeE433** | **Petroleum Production Engineering II** | X | | X | | X | | | X | | X | |
| **PeE434** | **Petroleum Project Management** | X | | X | | X | | X | X | | X | |
| **PeE435** | **Secondary Oil Recovery** | | | | | | | | X | X | X | X |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PeE436** | **Numerical Methods and Reservoir Simulation** | X | | X | | X | | | X | X | X | X |
| **PeE437** | **Gas Technology** | X | X | X | X | X | X | X | X | X | X | X |
| **PeE438** | **Engineering Project & Ethics** | X | X | X | X | X | | X | X | X | X | X |

## 3.4 Courses Syllabi

### *3.4.1 University Course Requirements*

***PeE219 Democracy and Freedom Concepts***

Designation as a required or elective course:
This is a required course.

***Course Description:***
This course is designed to give the student the definition of freedom and democracy. It explains the history of democracy, democracy and freedom properties, and ancient democracy & its comparison to modern one.

***Recommended Textbook(s):***
By topics.

***Prerequisites:***
None.

***Course Topics:***
1. The concept of democracy.
2. The concept of freedom.
3. History of democracy and freedom.
4. The properties and principles of democracy and freedom.
5. The relationship between freedom and democracy.

***Course Outcome:***
1. Learn what democracy is.
2. Learn what freedom is and how it can be achieved.
3. Get a comprehensive view of democracy and freedom properties.
4. Learn how Iraq tries to achieve freedom through its democratic laws.

**Subject: English Language I** **Theoretical: 1hr / week**

**Code: U111 / 1st Semester** **Practical: ---**

**Class: 1st Year** **Tutorial: 1hr / week**
**Pre-requisite: None** **Units: 1**

==========

This course is designed to enable the students to achieve academic oral and written communication to the standard required at university level. The course integrates all the language skills with emphasis on writing, and it stimulates students' imagination, and promotes personal expression. Students, in this course, are trained to apply critical thinking skills to a wide range of challenging subjects from diverse academic disciplines. Course activities include writing various types of academic essays, acquiring advanced academic vocabulary, and getting involved in group discussions and debates. In addition, the course also includes other skills to consolidate the main skills, such as further readings and use of the Blackboard Suite.

**Subject: English Language II** **Theoretical: 1hr / week**
**Code: U121 / 2nd Semester** **Practical: ---**
**Class: 1st Year** **Tutorial: 1hr / week**
**Pre-requisite: None** **Units: 1**

==========

This course is designed to enable the students to achieve academic oral and written communication to the standard required at university level. The course integrates all the language skills with emphasis on writing, and it stimulates students' imagination, and promotes personal expression. Students, in this course, are trained to apply critical thinking skills to a wide range of challenging subjects from diverse academic disciplines. Course activities include writing various types of academic essays, acquiring advanced academic vocabulary, and getting involved in group discussions and debates. In addition, the course also includes other skills to consolidate the main skills, such as further readings and use of the Blackboard Suite.

*3.4.2 College Course Requirements*

## 1st Year/1st Semester

**Subject: Mathematics I** **Theoretical: 2hrs / week**
**Code: E112 / 1st Semester** **Practical: ---**
**Class: 1st Year** **Tutorial: 2hrs / week**
**Pre-requisite: None** **Units: 3**
==========

**Brief Review:**

Trigonometry, Analytic Geometry, Sets, Relations, Functions (Algebraic and Trigonometric), Differentiation and Integration.

**Transcendental Functions:**

Inverse Trigonometric, Natural Logarithmic, Exponential and Power:
i. Definitions ii. Properties iii. Graphs iv. Derivatives and Integrals.

**Application of the Definite Integral:**

i) Areas between curves. ii) Volumes of revolution. iii) (Length of the curve. iv) Surface Area of revolution.

**Hyperbolic Function:**

i) Definition, ii) Properties iii) Graphs iv) Inverse hyperbolic.
v) differentiation and Integration

**Methods of Integration I:**

Trigonometric Substitutions , Quadratics, Partial Fractions.

**Subject: Engineering Drawing I (Basic)** **Theoretical: 1hr / week Code: E118 / 1st Semester** **Practical: ---**
**Class: 1st Year** **Tutorial: 2hrs / week Pre-requisite: None** **Units: 2**
==========

Introduction

- Graphic Instruments and Their Use
- Lettering
- Graphic Geometry
- Multi View Ortho Graphic Projection in First and Third Angle Projection
- Dimensions
- Third View
- Isometric Drawing and Sketching
- Oblique Drawing
- Section of Isometric Drawing Sectional View

**Subject: General Geology I** **Theoretical: 2hrs / week**
**Code: PeE111 / 1st Semester** **Practical: 3hrs / week**
**Class: 1st Year** **Tutorial: ---**
**Pre-requisite: None** **Units: 3**
==========

- Introduction (nature of geology, solar system, structure and shape of earth)
- Matter, energy, minerals, atoms, elements, bonding, natural radioactivity, time in geology, rock forming minerals, physical properties of minerals.
- Igneous activity (magma) formation of igneous rock, mineral composition of igneous rocks, common igneous rocks.
- Sedimentary rocks (conversation sediments to sedimentary rock, Lithifcation, origin & classification of sedimentary rocks (common sedimentary rocks).
- Metamorphic rock (concept of metamorphism, agents & types of metamorphism, identification of common metamorphic rocks.
- weathering, erosion and soil, environment of weathering, mechanical weathering, chemical weathering, examples of selected rocks & minerals, soil profile.

**Subject: Computing Programming I** **Theoretical: 2hrs / week**
**Code: PeE112 / 1st Semester** **Practical: ---**
**Class: 1st Year** **Tutorial: 2hrs / week**

**Pre-requisite:** None **Units: 3**

==========

1. **Problem solving algorithms**

   Data structures, searching and sorting algorithms

2. **V. Basic Variables**
   1) Variable types
   2) Variable Names
   3) Declarations
3. **Assignment statements and expressions in V. Basic**

   Logical expressions and operators

   Mathematical expressions and operators

4. **Conditional Decisions and Loops**

   **(a) Conditional Decisions**
   1) If/Then/End If statement
   2) If/Then/Else/End If statement
   3) If/Then/ElseIf/End If statement
   4) Select Case statement
   5) Switch statement
   6) IIf statement
   7) Choose statement

   **(b) Loops**
   1) For-Next statement
   2) While-Wend statement
   3) Do Until-Loop statement
   4) Do While-Loop statement
   5) Do-Loop Until statement
   6) Do-Loop While statement
5. **ARRAYS**
   1) Declaring Arrays
   2) Input and Output Arrays
   3) Generate Specific Array Elements
   4) Computational (mathematical) processes that take place on the matrices (arrays)

**Subject: Analytical Chemistry** **Theoretical: 2hrs / week**
**Code: PeE113 / 1st Semester** **Practical: 3hrs / week**
**Class: 1st Year** **Tutorial: ---**
**Pre-requisite: None** **Units: 3**
==========

- Introduction to Stoichiometry
- Acid-basic titration.
- Precipitation titration.
- Redox titration.
- Various butteries & electronic cells.
- Principles of corrosion.
- Water for domestic uses.
- Industrial water.
- Atmospheric pollution.

**Subject: Statics Mechanical Engineering** **Theoretical: 3hrs / week**
**Code: PeE114 / 1st Semester** **Practical: 2hrs / week**
**Class: 1st Year** **Tutorial: ---**
**Pre-requisite: None** **Units: 3**
==========

Force system, units system, parallelogram law, force+ components, resultant of coplanar forces, components of force in space, moment of a force, moment of coupler, equilibrium, free body diagram, coplanar system, analysis of trusses, friction, nature of friction, theory of friction, coefficient of friction, centroids and center of gravity, centroids of area, centroids determined by integration, moments of inertia, parallel axes theorem, 2nd moment of area by integration, radius of gyration, moment of inertia of composite area.

**Workshop Skills**

The workshop training program is designed to satisfy the following:

Objectives Teaching safety rules and regulations on-site in an industrial environment proper use of working tools, instruments, and machines, introducing basic workshop practices, production, labor, and time-requirements of workshop operations. The students are introduced to training programs in six workshops: welding, forging, turning and milling, carpentry, and casting. The student is to spend 2 hours of training in every workshop

**Subject: Physics I** **Theoretical: 2hrs / week**
**Code: PeE115 / 1st Semester** **Practical: ---**
**Class: 1st Year** **Tutorial: ---**
**Pre-requisite: None** **Units: 2**
==========

- Energy and its Conservation:
- energy, work, power,
- gravitational potential energy, kinetic energy, conservation of energy.
- Simple Harmonic Motion: periodic motion, simple harmonic motion,
- the potential energy of a spring, conservation of energy and the vibrating spring.
- Wave Motion: mathematical representation of a wave,
- speed of a transverse wave on a string, reflection of a wave at a boundary,
- sound waves, the transmission of energy in a wave and the intensity of a wave.
- Fluids: density, pressure, Pascal principle,
- Archimedes principle,

## 1st Year / 2nd Semester

**Subject: Mathematics II** **Theoretical: 2hrs / week**
**Code: E122 / 2nd Semester** **Practical: ---**
**Class: 1st Year** **Tutorial: 2hrs / week**
**Pre-requisite: Mathematics-I** **Units: 3**

==========

**1) Methods of Integration II:**

Integration by parts, Further Substitutions.

**2) Approximation Integral:**

i) Trapezoidal ii) Simpson

**3) Vector Algebra:**

i) Representation of Vectors in space (I,j.k) (unit vectors ii) Scalar Product iii) Vector product.

**4) Complex Numbers:**

i) Invented number systems ii) The Argand diagram. iii) Addition, Subtraction, product, Qutient, Power and Roots. iv) Demoivers theorem.

**5) Polar Coordinates:**

i) The polar coordinate system. ii) Graphs of polar equations. iii) Plane area in polar coordinates.

**6) Matrices and Determinats:**

i) Definition ii) Properties. iii) Inverse of a matrix. iv) Solution of Equations (Cramer's rule).

**Subject: Engineering Drawing II (AutoCAD) Theoretical: 1hr / week Code: EE128/2nd Semester Practical: --**
**Class: 1st Year Tutorial: 2hrs / week Pre-requisite: Engineering Drawing-I (Basics) Units: 2**

==========

The use of CAD in engineering drawing. Description of menu Bar and toolbars. Drawing Ellipse, Rectangle, line, Ray, Circle, point, Arc, etc.

CAD Electrical, Mechanical/ Special features

The use of various layers. Drawing electrical symbols on simple architectural plans.

3-D Drawing, render, orthogonal projections and sectional views.

**Subject: General Geology II** **Theoretical: 2hrs / week**
**Code: PeE121 / 2nd Semester** **Practical: 3hrs / week**
**Class: 1st Year** **Tutorial: ---**
**Pre-requisite: None** **Units: 3**
==========

- Ground water (movement of the origin &storage of ground water, mechanism of ground water flow, aquifers, springs & wells.
- Shore lines (circulation of the ocean, tides, wave erosion, wave transportation, wave deposition, development of shore lines.
- Earthquakes & earth's interior (shape &size of earth, Wight of earthsiemology, causes of earthquakes, prediction & control, internal structural of earth.
- Contents (topographic features of the earth surface, deformation of rocks (folods &faults), mountains &their origin.
- Sea-floor spreading (age, magnetic studies, movement of the sea floors, crystal plates, transform faults), continental drift current, energy).
- Historical geology (evolution & fossilization, Paleozoic cycle, Cenozoic cycle, Pleistocene, life of Cenozoic .

**Subject: Computer Programming II** **Theoretical: 2hrs / week**
**Code: PeE122 / 2nd Semester** **Practical: ---** **Class: 1st Year**
**Tutorial: 2hrs / week Pre-requisite: Computer Programming I** **Units: 3**
==========

1. Review of basic instructions of V. Basic to prepare for advanced V. basic
2. Built in Functions
3. User defined functions and subroutines
4. Sequential files

5. Random Files
6. MS chart
7. MS flex grid
8. Tree
9. Data base control
10. Picture control

Image Control

**Subject: Organic Chemistry** **Theoretical: 2hrs / week**
**Code: PeE123 / 2nd Semester** **Practical: 3hrs / week Class: 1st Year** **Tutorial: ---**
**Pre-requisite:** **Units: 3**
==========

- Organic chemistry.
- Fuels (introduction).
- Types of fuel composition.
- Calorific
- Chemical reaction.
- Simple combustion.
- Lubricants & lubrication
- Plastic & elastomers.

**Subject: Dynamics Mechanical Engineering** **Theoretical: 3hrs / week**
**Code: PeE124 / 2nd Semester** **Practical: ---** **Class: 1st Year**
**Tutorial: 2hrs / week Pre-requisite:** **Units: 3**
==========

Kinetics of particle, rectilinear motion, curvilinear motion, rectangular components of curvilinear motion, normal and tangential component of acceleration, kinetics, force, mass and acceleration, kinetic of particle Newton's 2nd law.

***Workshop Skills**

The workshop training program is designed to satisfy the following:

Objectives Teaching safety rules and regulations on-site in an industrial environment proper use of working tools, instruments, and machines, introducing basic workshop practices, production, labor, and time-requirements of workshop operations. The students are introduced to training programs in six workshops: welding, forging, turning and milling, carpentry, and casting. The student is to spend 2 hours of training in every workshop

**Subject: Physics II** **Theoretical: 2hrs / week**
**Code: PeE125 / 2nd Semester** **Practical: ---** **Class: 1st Year** **Tutorial: --**
**Pre-requisite:** **Units: 2**
==========

- equation of continuity,
- Bernoulli theorem,
- viscosity,
- stress and strain.
- Surface tension: interfacial tension, contact angle,
- wetting phenomena, capillary pressure.
- Heat transfer: convection, conduction, and radiation
- Coulomb law and the electric field,
- flux, Gauss law, electric potential.

***Fluid Mechanics***

- Dimensions & units, dimensional analysis.
- Process variables: physical state, overall mass balance, overall energy balance, overall momentum balance.
- Concept of fluid behavior, Newtonian and non- Newtonian fluids, laminar and turbulent flow in circular tube.
- Flow measurement.
- Pitot tube, venturi menter, orifice meter, rota meter.
- Some design equations for the flow of incompressible fluids.
- Friction losses in pipes and fittings.
- Two-phase flow.
- Fluid machinery.

***Electrical Technology***

- D. C. circuits.
- A. C. circuits.
- Magnetic circuits.
- Construction and characteristics of D. C. machines
- transformers and induction motors.
- Measuring instruments for voltage, current, power and temperature.

***Mathematics 2***

- Polar coordinates: graphs in polar coordinates, arc length and areas in polar coordinates.
- Vectors in two and three space: Cross products,
- vector valued functions
- motion along curves,
- differentiation and integration of vector valued functions.
- infinite series: divergence and convergence of series, Taylor and Maclanian series.
- Functions of more than one variable: partial differentiation,
- extreme values gradients, Lagrange multiplier.
- Multiple integrals: change of order,
- change from Cartesian to polar coordinates
- first order differential equations,
- introduction to second order differential equations.

***Mechanics of Materials***

- Stress: simple stress, shearing stress, bearing stress,
- thin wall cylinders,
- strain stress diagram, Hook law, poison's ratio,
- thermal stress,
- torsion formula,
- flanged bolt,
- coupling helical springs
- shear and bending moments, diagrams,
- analytical and graphical deflection,
- buckling,
- special topics.

***Structural & petroleum Geology***

- Mechanics of structural deformation: folds, faults, and joints,
- unconformities, sedimentary environments,
- origin of oil, generation,
- migration and accumulation of petroleum.
- Source rocks, reservoir rocks, cap rock,
- traps (types and discovering techniques),
- reservoir mechanics (pressure, temperature, reservoir energy),
- subsurface mapping,
- oil field waters,
- Iraq and middle East oilfields.

***Computer Programming 2***

- Introduction to computer science,
- digital system;
- machine language,
- compilers,
- operating systems, file systems, banking systems,
- programming with FORTRAN77,
- numerical methods,
- networks,
- tables, graphics.
- Programming with Matlab

***Engineering Mathematics***

- Ordinary differential equations,
- partial differential equations,
- solutions of ordinary differential equations,
- applications of first and second orderinery differential equations,
- solutions by Laplace transforms,
- Bessel functions,
- Fourier series,
- Taylor series,
- numerical methods.

***Engineering Thermodynamics***

- Temperature and heat: temperature, heat,
- specific heat, calorimetry,

- change of phase,
- thermal equilibrium. Thermal expansion: linear, a real and volume expansion of solids,
- volume expansion of liquid and gases;
- Charles's law.
- Boyle's law,
- the ideal gas law,
- kinetic theory of gases, equations of state. Application of the concept of work to a thermodynamic system, heat added and removed,
- first law of thermo dynamics, some special cases of the first law the gasoline engine,
- the ideal heat engine, the carnot cycle.
- The second law of thermodynamics:
- heat engine and the second law, refrigeration and the second law, reversibility,
- entropy, statistical interpretation of entropy.
- Binary system, multi-component system,
- bubble point, dew point, phase envelop,
- critical pressure-critical temperature.

### *3.4.3 Department Course Requirements*

***Fundamental of Petroleum Engineering***

- The oil well "a brief outline", system of units, Drill string design, Drill string accessories, Drill Bit.
- Three cone bit feature, PDC bit feature, diamond bit.
- Function of drilling mud, functional properties of mud basic mud types.
- Functions of casing, casing types, casing strength properties casing specification. Basic factors for casing design casing accessories.
- Functions of cement., clauses and types of cement.
- Basic component of cement, properties of cement slurry method of cementing. Practical cement calculator.
- Hole problems., pipes sticking, lost circulation shale problems, well kick and blow out.
- Completion equipment,
- types of well. Completion. Types of packer, well completion program,
- perforating of oil and gas wells, perforating techniques, perforating fluid selection of perforated in eternals
- Types of Traps : Lithology of petroleum Reservoirs ,Reservoirs Driving Mechanisms .
- Reservoir Rock Petro physics, porosity, permeability, saturation, Capillary pressure .
- Darcy s law and applications, PVT analysis for oil .
- Well inflow equation for stabilized flow conditions
- Real Gas flow, Gas Well Testing.
- Natural Water Influx.
- Production Engineering, Properties of Hydrocarbon Mixtures, Flow of Fluids,

- Natural flow performance, Sucker Rode Pumping,
- Stimulation and Remedial Operations.

***Oil properties***

- Crude oils (chemical composition, classification, properties),
- density, specific gravity and coefficient of expansion,
- viscosity, molecular weight, vapor pressure,
- specific heat, latent heat, heat of combustion,
- boiling range, flash point, pour point,
- sulfur content, aniline point,
- penetration number, softening point,
- crude oil evaluation,
- fractional distillation and TBP curve,
- analysis of fraction,
- dehydration of crude oil,
- natural gas properties,
- oil field water properties

***Petroleum Reservoir Engineering 1***

- Types of traps; fluids distribution,
- types of oil reservoirs, porosity compressibility, permeability,
- Darcy's Law; linear flow (piston like, leaky piston),
- Gas flow equation, Radial flow, productivity equation, radial flow of gas,
- average permeability for stratified reservoirs,
- klinkenberg effect, flow through channels and fractures,
- saturation, capillary pressure, wettability,
- Multiphase flow through porous media,
- effective and relative permeability; calculation of relative permeability, fractional flow equation, buckley-Leverett equation,
- Gas properties (Boyle and charle's laws, Avogadro law, Dalton law, equation of state).
- Compressibility factor, liquids properties (PVT), viscosity,
- classification of reservoirs according to P-T diagram, phase behavior,
- calculation of bubble point and dew point,
- behavior of non-ideal liquids, flash and differential degassing,
- determination of reservoir liquids,
- properties of formation water, volumetric calculation of reservoirs,
- material balance equation, material balance for water derive and gas derive reservoirs,
- calculation of reservoir pressures.

***Petroleum Drilling Engineering 1***

- Introduction to drilling;
- classification of drilling operations,
- properties and functions of drilling fluid,
- types and properties of clay in water,
- types of drilling fluids, drilling hazards dependent on mud control, drilling mud calculations,
- drilling methods (cable tool drilling, rotary drilling),
- basic component of rotary drilling equipment, drilling string and accessories,
- types of bits,
- casing of oil wells, functions of casing, types of casing,
- strings, parameters of casing design, selection of casing and bit types,
- design of string, graphical design of casing,
- cementing of oil wells,
- classification of cementing operations,
- cementing equipment, methods and calculations of cementing,
- Hydraulics of primary cementing operations.

***Well logging***

- Fundamentals of quantitative log interpretations,
- conventional electric logs,
- lateral logs,
- induction logs,
- micro resistively devices,
- sonic log,
- formation density log,
- neutron log, gamma ray log,
- thermal decay time logs,
- electromagnetic waves penetration time (EPT) logs.

***Geophysics***

- Gravity methods (prospecting), principles, instruments,
- field measurements, gravity corrections, interpretations,
- gravity anomalies and geological structures.
- Magnetic methods, principles the earths magnetic filed,
- filed measurements, magnetic corrections, interpretation.
- Seismic prospecting,
- elastic theory, seismic waves, seismic waves and the earths structure methods of seismic prospecting

- A-reflection method: principle, filed work and processing, interpretation,
- B-Refraction method, principles, field work, interpretation.

***Petroleum Engineering Economics and Statistics***

***a. Economics***

- Oil and gas reserve, organization of petroleum exporting and importing countries,
- international supply and demand of petroleum,
- classification of petroleum, petroleum pricing, alternative energy, international strategy of energy,
- time value of money, types of interest rates, rate of return,
- methods of engineering decisions, depreciation, depletion, amortization, taxation, inflation,
- sensitivity analysis of engineering projects,
- risk analysis production decline curves,
- evaluation of future production of oil and gas wells.

***b. Statistics***

- Importance of statistics,
- descriptive and inferential statistics, pictorial description of data, random sample selection,
- data classifications, frequency distributions, cumulative frequency distributions,
- graphical representation of data histograms, frequency polygon, measures of probability variation and the binomial distributions,
- Poisson distribution,
- normal distribution,
- correlation and regression analysis.

***Industrial Safety & pollution***

- Magnitude of the accident toll.
- Accident costs.
- Evaluation of safety performance.
- Injury sources, cases and distribution.
- Effective safety program.
- Job safety analysis.
- Plant inspection.
- Accident investigation.
- Plant house keeping.
- Maintenance.
- Handing material: hand tools.

- Low voltage electrical hazards.
- Fundamentals of machine guarding.
- The prevention of falls.
- Methods of promoting safe pact ice.
- Safety organization.
- Safety and health standards and rules.
- First aid.
- Occupational health hazards.
- Personal protective equipment.
- Fire prevention and protection.
- Ionizing radiations protection.

***Petroleum Production Engineering 1***

- Well completion operations (parameter of design, completion methods, equipment, completion fluids);
- perforation of oil and gas wells (perforation methods, selection of perforation intervals);
- water and gas coning; methods for determining oil production rate without coning; completion efficiency,
- drill stem test (DTS) (test method, equipment, pressure versus time curve, theory of pressure buildup, reservoir properties obtained, depletion);
- Helical buckling of tubing (forces, homogeneous completion, packers permitting free and limited motions, compound completion of wells);
- surface gathering systems (types of gathering systems, behavior of fluid flow, flow lines, essential flowing lines, valves);
- separation of oil, gas, & water (types of separators, components of separators and functions);
- oil storage (storage tanks and accessories, calibration, measurement of liquid level);
- Production by pumps (sucker and submersible pumps).

***Petroleum Production Engineering II***

- Types of reservoirs and radial flow in the reservoirs,
- productivity index, in flow performance relationship (IPR),
- effect of stratification and water cut on IPR,
- productivity index test, Vogel method, Standing method, Couto method, Fetkovich method, Al-Saadoon method,
- mathematical and physical principles for pressure drop calculations,
- flow pattern and the relation with pressure order,

- Poettmann and Carpenter method, Dukler method, working charts, analysis of choke performance,
- prediction of restricted and unrestricted production,
- effect of other parameters on well performance derivation and solutions of diffusivity equation,
- application of Horner solution, maturates test, draw-down test,
- effect of skin factor on well testing,
- analysis of tests that affected by barrier, bounded reservoirs, gas lift operations,
- stimulations operations (acidizing and fracturing).

***Petroleum Drilling Engineering II***

- Casing landing (landing as cemented, landing in tension at the freeze point, landing in compression at the freeze point),
- buckling phenomenon,
- wellhead loads, blowout and blowout prevention,
- well kick (methods of control, drillers method, engineers method),
- factors affecting drilling rate (effect of pressure, effect of physical properties of drilling mud, effect of weight on bit and rotary speed economical effect),
- hole problems (pipe sticking, surge and swab pressure, hole deviation),
- directional drilling, factors affecting hole inclination of directional wells, types of directional wells,
- geometry of a directional well,
- methods of calculations of directional wells,
- horizontal drilling,
- types of horizontal wells,
- air drilling, design of air drilling operations.

***Petroleum Reservoir Engineering II***

- Fundamental concepts,
- oil reservoirs: depletion drive,
- water drive gravity drainage reservoir,
- combination drive reservoirs,
- pressure maintenance, secondary recovery,
- gas reservoirs,
- gas-condensate reservoirs,
- miscellaneous subjects.

***Secondary oil Recovery***

- Principles and definitions,
- choice of proper methods for enhanced oil recovery,
- recovery by water displacement,
- Buckley-Leverett method,
- welling method, stiles method, original and improved Dyksra-parsons method,
- pattern of flooding, sweep efficiency,
- properties of injected water, injected pressures,
- recovery by immiscible gas,
- Tarner method, Muskat method,
- recovery by miscible gas,
- dry gas injection,
- enriched gas injection,
- CO2 injection, N2 injection ,
- thermal recovery, heat flow through rocks,
- seam injection, insect combustion tertiary oil recovery,
- surfactant flooding, solvent injection,
- polymer injection.

***Numerical Methods and Reservoir simulation***

- Interpolation, ( Linear, Lagrange),
- Matrices, Review of matrix properties,
- Determinates, inverse of matrix,
- solution of system of linear equations (Gaussian elimination, Gauss Jordan method, Jacobi method, Gauss Seidel method),
- least Square method (linear equations, polynomial equations)
- Reservoir simulation (Introduction, types of simulators) flow through porous media (derivation of single phase, one-dimensional flow equation,
- two and three-dimensional flow equation),
- finite difference method (Taylor series, forward difference, backward difference, central difference, concepts of explicit and method implicit methods),
- solution of system of difference equations ctridiagonal algorithms, use of irregular Gridding, transmissibility,
- the finite difference from of the flow equation in terms of transmissibility,
- Averaging of rock and fluid properties, solution of radial from of the flow equation, two dimensional flow,
- setting up the finite difference from, ordering schemes, standard row ordering, standard column ordering,
- resulting matrix structure,
- introduction to multi-phase flow through porous media.

***Gas Technology***

- Properties of gases;
- gas system analysis;
- gas flow through P. M.;
- gas transportation,
- gas treatment & liquefaction;
- gas sweetening and dehydration.

***Reservoir Management***

- introduction to reservoir management,
- the base map, isopach map,
- net pay thickness, cross sections,
- well correlation using logs, isoporosity map, bubble map, routine map, analysis, special core analysis,
- screening of core data, using correlations to estimate missing data,
- calculation of initial fluids in place, material balance,
- determination of reservoir type,
- building reservoir model, history matching,
- optimization of surface facilities,
- suggestions to increase production by plugging, perforation, completion, etc.,
- development strategies,
- drilling new wells, completion,
- suggesting additional necessary surface equipments,
- economic evaluation of the proposed strategy.

***Engineering Project***

- Students as groups (of 3 or 4) are requested to carry out a study on one of the problems related to petroleum engineering under the supervision of one of the staff members. Each group must submit a report before the end of the second term. The students must give a presentation of their work to an interview committee of staff members.

The SWOT analysis gives:

| | Helpful (to achieving the objective) | Harmful (to achieving the objective) |
|---|---|---|
| Internal origin (attributes of the department) | **Strengths**<br>- The 148 total credit hours are equal to the number of credit hours at other PeE departments in Iraq and worldwide.<br>- The used textbooks are updated by the faculty member her/himself using the internet. Thus, no outdated textbooks are used. | **Weaknesses**<br>- There should be two elective courses, which are in fact not elective since the students have no choice but studying them due lack of staff.<br>- The senior year project is worthy of only few percentage of the credit hours; it must be given more credit hours. |
| External origin (attributes of the environment) | **Opportunities**<br>- If each faculty member well writes and updates her/his curriculum outcomes, s/he will definitely help in improving the overall POs of the program. | **Threats**<br>- Each faculty member can only change 20% of the curriculum content.<br>- The inability to include new curriculum since the ministry rules doesn't allow such changes. |

# Chapter4: Criterion4 (Faculty)

## 4.1 Leadership Responsibilities

The chairman of the petroleum engineering department is the most pivotal of all positions concerned with the instructional development. The policies of the college and university delegate the prime responsibility of the department daily operation to the chairman. The chairman is thus, assigned the task of running and managing the department. As the executive officer, the chairman is responsible to both the dean of the college of engineering and the department. It is the chairman who maintains daily contacts with the administration, with faculty and with students. It is in this last context where the chairman has to ensure that the department's mission and educational objectives are met. This could be achieved through the following:

1. Departmental affairs: developing and accomplishing departmental missions and objectives within those of the university; establishing departmental policies; conducting departmental meetings; involving faculty members and students in departmental decision making and activities.
2. Academic affairs: establishing departmental degree programs and curricula; evaluating, updating and improving program curricula, and the enforcing the quality of instruction.

3. Office management: administering departmental facilities; hiring, supervising, evaluating staff personnel (secretaries, laboratory assistants); establishing file and record systems (faculty, students, courses, academic data, correspondence); maintaining equipment and other department properties; requisitioning supplies; ordering textbooks.
4. Personal professional performance: providing professional leadership and setting an example in the department; demonstrating professional competence in teaching, research, and other professional activities; participating in professional associations and community service, setting academic standards; preparing term schedules of courses.
5. Faculty affairs:
    - Recruiting and orienting new faculty members; supporting and encouraging high performance in teaching, research, conference attendance, seminars, workshops, and other professional activities;
    - Enforcing faculty responsibilities and protecting faculty rights; evaluating faculty members and making documented recommendations to the dean for them.
6. Student affairs:
    - Facilitating a constructive environment to consolidate the program teaching and learning process.
    - Curricular and career advising of students.
    - Responding to student grievances and complaints.
    - Certifying students for graduation.
7. Program affairs:
    - Arranging meetings with faculty to decide on further steps to improve the program.
    - Managing the essential funds for laboratory equipment, day-to-day functioning, other department social activities, etc.
    - Executing the PeE Program, alteration, and improvement proposed by program constituencies.
8. External communications: conveying university policies and actions to the department, representing the department in the college, the university and all external agencies and communicating departmental programs and activities to students.
9. Budgetary affairs: preparing annual departmental budget requests; administering budgetary allocations (preparing requisitions, authorizing expenditures, maintaining budget records).

## 4.2 Authority and Responsibility of Faculty

Faculty members are the back bone of the department and their role in the running of the department is very crucial. It is the department senate or faculty council that makes decisions, recommendations, proposals and policy changes within the department. The approval of the majority of the council is essential prior to passing to the chairman for further action. In effect, the department's council role is not limited only to academic matters but goes beyond that to

include all aspects of governing the department. Though the responsibilities could vary among individuals in the department, all members participate in the following activities:

1. Teaching: proposing new curriculum courses, modifying and updating existing courses; course evaluation through conducting exams, quizzes, assignments, projects, etc. In order to provide consistency in the department, faculty members in the Petroleum Engineering Department are recommended to:
   - Keeping up to date with relevant changes in their related fields and carefully preparing lectures and course materials.
   - Being accessible to students for academic consultation during scheduled or prearranged office hours.
   - Informing students regarding course formats, assignments, and methods of evaluation.
   - Maintaining teaching schedules in all but exceptional circumstances.
   - Informing students of any necessary cancellation and rescheduling of instruction.
   - Adhering to the schedules for submission of grades and evaluations by the department.
2. Research: devote a good portion of their time to carry out research or creative work, within the constraints of the relatively heavy teaching loads. All full time faculty members are encouraged to make the results of such activities available, to other researchers and academicians, through publications, lectures, and other appropriate means.
3. Service to the university: some faculty members in the department are assigned different tasks at the university level. This is realized, among other duties, through; reviewing of academic publications, editorial board members, organizing International conferences, and other academic associations and consultancy assignments.

## 4.3 Faculty

The petroleum engineering department has 12 full and part time faculty members, including the chairman of department. In terms of rank distribution, they are broken down as follows:

- 6 Lecturers
- 7 Assistant Lecturers

Among our faculty, the number of years of teaching experience ranges from 1 to 20 years. In the process of assessing the faculty activities in the PeE department it was realized that, on the average, the department is more tilted towards teaching rather than research and other scholarly activities. Detailed information regarding the credentials, experience, workload, and committees' involvement of the faculty member in the PeE department is included in **Tables 4.1** and **4.2** below.

**University of Basrah**

**College of Engineering**

**Petroleum Engineering Department**

## Table4.1: Faculty Workload Summary for the Academic Year 2015-2016

| Faculty Member | FT or PT | Rank | Degree, Institution from which Degree Earned, Year | Experience | | | Classes Taught through 2015-2016 (Credit Hours) | Total Activity Distribution | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Total Faculty | This Institution | Work & Other | | Av. Load Hs/Week | Teaching | Research | Others |
| Sajed Hussein Ali | FT | Lecturer | PhD, University of Al-Baker(University of Technology حاليا), Iraq, 2003 | 32 | 2 | 16 | PeE327(4) | 4 | 40% | Under Graduate Studies Load | |
| Ammar Ali Ojimi | FT | Lecturer | PhD, Basrah University, Iraq, 2011 | 15 | 7 | 0 | PeE126(7) | 5 | 40% | Under Graduate Studies Load | |
| Hisham Kadhum Hashim | FT | Lecturer | PhD, UPM, Malaysia, 2012 | 13 | 8 | 0 | PeE121(4) PeE224(3) | 8 | 60% | Under Graduate Studies Load | |
| Ali Kamil Marzook | FT | Lecturer | PhD, UPM, Malaysia, 2013 | 15 | 8 | 0 | PeE328(4) PeE438(4) | 7 | 55% | Under Graduate Studies Load | |
| Salam Abd Alqader Falih | FT | Lecturer | M.Sc., Basrah University, Iraq, 2009 | 15 | 10 | 6 | - | - | - | - | |
| Ethar Hisham Khalil | FT | Assistant Lecturer | M.Sc., Baghdad University, Iraq, 2008 | 8 | 5 | 0 | - | - | - | - | |
| Amani Jalel Majeed | FT | Lecturer | M.Sc., Basrah University, Iraq, 2010 | 6 | 6 | 4 | - | - | - | - | |
| Khawlah Naeem Hammood | FT | Assistant Lecturer | M.Sc., Baghdad University, Iraq, 2008 | 13 | 5 | 8 | PeE222(4) PeE124(6) | 8 | 67% | Under Graduate Studies Load | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Noor Hatem Obais | **FT** | Assistant Lecturer | **M.Sc., Jawagher University, India, 2012** | **5** | **1** | **1** | **-** | **-** | **-** | **-** |
| Jasmin Fadhel Jassim | **FT** | Assistant Lecturer | **M.Sc., Basrah University, Iraq, 2009** | **14** | **6** | **8** | **PeE227(6)** | **10** | **83%** | **Under Graduate Studies Load** |
| Hasanain Sami Abd Alhadi | **FT** | Assistant Lecturer | **M.Sc., Basrah University, Iraq, 2009** | | | | **-** | **-** | **-** | **-** |
| Nuhad Abd Al-Sada Taha | **FT** | Assistant Lecturer | **M.Sc., Basrah University, Iraq, 2013** | **9** | **9** | **0** | **PeE122(6)** | **12** | **100%** | **Graduate Studies Load** |
| Hutheem Abdullah | **PT** | Assistant Prof. | **PhD, Basrah University, Iraq** | | | | **PeE339(4)** | **2** | **20%** | **Under Graduate Studies Load** |
| Basim Abd Al-Hassan | **PT** | Lecturer | **PhD, Basrah University, Iraq** | | | | **PeE125(7) PeE235(3)** | | | |
| Tahseen A. Na'em | **PT** | **Assist. Lecturer** | **M.Sc., Baghdad University, Iraq, 2008** | | | | **PeE431(4) لمدةنصف السنة الثانية** | **4** | **20%** | **Under Graduate Studies Load** |
| Ali Noor El-Dean Abdul Kareem | **PT** | **Assist. Lecturer** | **M.Sc., Baghdad University, Iraq, 2008** | | | | **PeE231(4) PeE336(4) PeE436(6)** | **11** | **60%** | **Under Graduate Studies Load** |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Ahmed Kadhum | PT | Lecturer | PhD, Basrah University, Iraq | | | | PeE333(4)<br>PeE433(4)<br>PeE123(4) لنصف سنة | | | |
| Walla Majeed Khdeer | PT | Lecturer | PhD, Baghdad University, Iraq | | | | PeE334(2) | 3 | 20% | Graduate Studies Load |
| Aheed | PT | Lecturer | PhD, Basrah University, Iraq, | | | | PeE226(4) | | | |
| Ali AbdulKareem | PT | Lecturer | M.Sc., Basrah University, Iraq | | | | PeE432(4)<br>PeE332(6) | | | |
| Ammar Ashore | PT | Lecturer | PhD, Basrah University, Iraq, | | | | PeE223(6) | | | |
| Ali Ashore | PT | Assistant Lecturer | M.Sc., Basrah University, Iraq | | | | PeE437(4) | | | |
| Ra'ed K. Sabri | PT | Assistant Lecturer | M.Sc., Baghdad University, Iraq | | | | PeE127(4) | | | |
| Ala'a Omer | PT | Assistant Prof. | PhD, Basrah University, Iraq | | | | PeE219(4) | | | |
| Ahmed Radee | PT | Assistant Lecturer | M.Sc.,University of Baghdad, Iraq | | | | PeE331(6)<br>PeE434(4)<br>PeE435(4) | | | |
| Ahmed | PT | Assistant Lecturer | M.Sc., Baghdad University, Iraq | | | | U111&U121(2) | | | |
| Kadhum Abed Al-Husain | PT | Assistant Lecturer | M.Sc., Baghdad University, Iraq | | | | PeE123(6) | | | |
| Ahmed Khder Ahmed | PT | Assistant Lecturer | M.Sc., Denmark | | | | PeE335(3)<br>لنصف سنة | | | Under Graduate Studies Load |

**Table 4.2: Faculty Involvement in Regular Committees at the Department**

| No. | Committee | Members | |
|---|---|---|---|
| 1 | Scientific Advisory and Graduate Affairs Committee | 1. Dr. Sajed Hussein Ali<br>2. Dr. Ammar Ali Ojimi | 3. Dr. Husham K. Hashim<br>4. Dr. Ali K. Marzook |
| 2 | Examination Committee | 5. Dr. Sajed Hussein Ali<br>6. Dr. Ammar Ali Ojimi<br>7. Dr. Ali K. Marzook | 8. Dr. Husham K. Hashim<br>9. Jasmin F. Jassim<br>10. Nuhad A. Taha |
| 3 | Importation Committee | 11. Dr. Husham K. Hashim | 12. Dr. Ammar Ali Ojimi<br>13. Masarra A. Mohammed |
| 4 | Summer Industrial Training Committee | 14. Jasmin F. Jassim | |
| 5 | Gratis Book Committee | 15. Nuhad A. Taha<br>16. Intisar Abdul-Ridha | 17. Hadeel Ribera |
| 6 | Laboratory Maintenance Committee | 18. Dr. Ali K. Marzook<br>19. Jasmin F. Jassim | 20. Dr. Husham K. Hashim |
| 7 | Quality Assurance Committee | 21. Khawlah Naeem<br>22. Masarra A. Mohammed | 23. Hadeel Ribera |
| 8 | Register of Students Committee | 24. Nuhad A. Taha | 25. Masarra A. Mohammed |
| 9 | Computer Lab Committee | 26. Khawlah Naeem | 27. Hadeel Ribera |
| 10 | The Absent Students | 28. Dr. Sajed Hussein Ali<br>29. Intisar Abdul-Ridha | 30. Hadeel Ribera<br>31. Abase Saedoon |
| 11 | The examination Committee | 32. Dr. Ali K. Marzook<br>33. Nuhad A. Taha | 34. Masarra A. Mohammed |
| 12 | moderate prices committee | 35. Dr. Husham K. Hashim<br>36. Jasmin F. Jassim | 37. Intisar Abdul-Ridha |
| 13 | purchases commission | 38. Dr. Ammar Ali Ojimi<br>39. Dr. Ali K. Marzook | 40. Abase Saedoon |
| 14 | Inventory Committee | 41. Khawlah Naeem | 43. Masarra A. Mohammed |

| | | | |
|---|---|---|---|
| | | 42. Intisar Abdul-Ridha | 44. Hadeel Ribera |

## 4.4 Faculty Competencies

The department is offering a wide spectrum of courses in diverse areas of petroleum engineering courses that includes, though not limited to; Drilling, Reservoir Engineering, Well Logging, Simulation, Gas Technology, Economics, Pollution and Safety , Production, and Fundamental of Petroleum Engineering. Table 4.3 gives the names of faculty, area of interest, and current program curricular areas taught by them

Table 4.3: Faculty's Specialization and the Program Curricular Areas

| Faculty | Area of Interest | | Curricular Areas |
|---|---|---|---|
| | General | Specific | |
| Sajed Hussein Ali | Mechanical Eng. | Heat Transfer | Thermodynamics |
| Ammar Ali Ojimi | Mechanical Eng. | Thermal | Engineering Mechanics |
| Husham K. Hashim | Electrical Eng. | Communication Eng. | Mathematics1<br>Electrical Principles1&3 |
| Ali K. Marzook | Electrical Eng. | Communication Eng. | Engineering Analysis<br>Engineering project & Ethics |
| Jasmin F. Jassim | Geology | Engineering Geology | Structure Geology |
| Nuhad Abd Al-Sada Taha | Geology | Engineering Geology | General Geology |

| Faculty | Area of Interest | | Curricular Areas |
|---|---|---|---|
| | General | Specific | |
| Khawlah N. Hammood | Mechanical Eng. | Thermal fluid | Mathematics2<br>Computer Programming 1 |
| Ahmed Khder Ahmed | Mechanical Eng. | Petrolum | Pollution and Industrial safety |
| Ali Abd Al-kareem | Petroleum Eng. | Drilling | Drilling3 & 4 |
| Ali Noor El-den | Petroleum Eng. | Reservoir Engineering | Well logging<br>Principles of Petroleum Engineering<br>Simulation of Reservoir |
| Basim Abd Al-Hassan | | | General Chemistry |
| Tahseen A. Naeem | Petroleum Eng. | Reservoir Engineering | Reservoir Engineering 2 |
| Ahead | Civil Eng. | structure | Mechanics of Material |
| Ammar Ashour | Civil Eng. | | Fluid Mechanics |
| Raaed | Science | Computer science | Computer Programming2 |
| Walla Majeed Khdeer | Geology | Geophysics | Geophysics |
| Hutheem Abdullah | Economics | Economics | Engineering Economics and Statistics |
| Ra'ed K. Sabri | Science-Physics | Physics | Physics |

| Faculty | Area of Interest | | Curricular Areas |
|---|---|---|---|
| | General | Specific | |
| Ahmed Radee | Petroleum Engineering | Reservoir Engineering | Reservoir Engineering 1<br>Secondary Oil Recovery<br>Petroleum project management |
| Ala'a Omer | Law | Law | Democracy and Freedom Concept |
| Ahmed | Literature college | English Literature | English Language |
| Kadhum Abed Al-Hussain | Civil Eng. | | Engineering Drawing & Descriptive Geometry |

## 4.5 Faculty Size

The total number of students in the department is 322, and the number of the PeE faculty members is 21. This data clearly indicate that, in terms of numbers, there has been serious problem, thus far, in handling the teaching loads and current undergraduate students enrolled in the program. Thus, student to faculty ratio is 16:1

The number of courses assigned to each faculty member, is on average two courses, while it is sometimes reach upto three courses. During 2016-2017, the department has:

- Assign Drilling courses to Dr. Mohammed Fazallee from Tehran University in addition to fourth year projects.
- Assign PeE331, PeE431 and PeE435 courses to Dr. Ali Reza from Tehran University in addition to fourth year projects
- Assign PeE 231, PeE336 and PeE436 courses to Mr. Ali N. Abdul Kareem from Meissen University in addition to fourth year projects.
- Assign PeE431 course to Mr. Tahseen A. Naeem from SOC in addition to three year projects.
- Assign PeE335 courses to Ass. Lecturer Ahmed Khdeer from Basrah University / Petroleum Department.
- Assign PeE437 course to Mr. Ali Ashore from SOC.
- Assign PeE331 and PeE435 courses to Mr. Ahmed Radee from SOC in addition to six year projects
- Recruit two part-time engineers to help in caring on libratory experiments.

## 4.6 Interaction with Students

Every faculty members in the department is requested to allocate a certain number of office hours, depending on his teaching load, per week. These office hours are mainly assigned for helping the students. S/He has the responsibility of

making the students aware of the scheduling of these hours. This interaction is much more manifested in; student advising, supervising senior projects, attending senior project exhibitions, professional society advising, and coordinating industrial training. Table 4.4 shows the names of the selected faculty advisors and their number of advisees.

**Table 4.4: Number of Advisee per Selected Faculty Members**

| Advisor Name | Advisee Year | No. of Advisee |
|---|---|---|
| Dr. Ali K. Marzook | 4th Year | 69 |
| Yasemin F. Jasim | 3rd Year | 78 |
| Dr. Hisham K. | 2nd Year | 62 |
| Dr. Ammar A. Ojaimi | 1st Year | 101 |

For this section, SWOT gives us:

| | Helpful (to achieving the objective) | Harmful (to achieving the objective) |
|---|---|---|
| Internal origin (attributes of the department) | **Strengths**<br>- Student to faculty ratio is 6:1 which is considered optimal.<br>- Most faculty members have teaching or working experience outside the university for a period of time. | **Weaknesses**<br>- The department is more tilted towards teaching rather than research and other scholarly activities.<br>- 30 % of the faculty members are teaching courses in fields other than their own area of interest. |
| External origin (attributes of the environment) | **Opportunities**<br>- The new adopted advising scheme will definitely improve the interaction between students and faculty members. | **Threats**<br>- The teaching load on most faculty members prevents them from assigning enough time for scientific research. |

# Chapter5: Criterion5 (Facilities)

## 5.1 Space

### 5.1.1 Classrooms

### 5.1.2 Laboratories

## 5.2 Resources and Support

### 5.2.1 Software Support

### 5.2.2 Department Library

The department does not have its own library; rather its students use the library of the college; the department only provides the gratis textbooks for students with students to book ratio equals 2:1.

### 5.2.3 Laboratories

Doing the SWOT analysis, we get:

| | Helpful (to achieving the objective) | Harmful (to achieving the objective) |
|---|---|---|
| Internal origin (attributes of the department) | **Strengths**<br>- Classrooms have data show devices.<br>- The department have computer lab, drilling lab, fluid lab and petroleum properties lab. | **Weaknesses**<br>- The department has no building, classrooms and no library.<br>- The department has no own library; it only has the section of gratis textbooks.<br>- The department has no an Internet connection which is working well. |

| | | |
|---|---|---|
| External origin (attributes of the environment) | **Opportunities**<br>- The department has assigned part of its building to establishing the "Basrah Center of Excellence and Innovation". The center has promised to provide the department with an optical link internet connection. | **Threats**<br>- There is only 16 PC in the computer lab which is not enough compared to the No. of student. |

# Chapter6: Criterion6 (Support)( من الكلية)

## 6.1 Department Budget Allocation Process

The Iraqi Ministry of Finance allocates the annual budget of all Iraqi ministries including the Ministry of higher Education and Scientific Research. The Ministry of Finance exerts all efforts possible in framing and application of the righteous financial policies to improve and develop the available resources for all ministries.

The Ministry of Higher Education and Scientific Research, in turn, allocates the planned annual budget to the University of Basrah which gives the college of engineering its share of the budget. Then, each department gets its own financial part from the college and uses it in fulfilling:

1. Employees' expenditures: employees' salaries, lectures wages, retired faculty salaries, specific expenses, university expenses, risk expenses, affiliation rewards, and other expenses.
2. Services requirements: deputations, ceremonial activities, students' expenses, researches reinforcement, building cleaning expenses, athletic activities, conferences, and banking services.
3. Commodities requirements: all equipments (laboratorial, medical, schooling, agricultural, publications, books, fuels, and others).
4. Equipment maintenance: all maintenance (watery, electrical, buildings, furniture, books, gardens, records, work, and appliances).
5. Funding costs: furniture (wood and metallic), appliances, personal computer, telephones, copiers, printers, books and magazines, calculators, and machines.

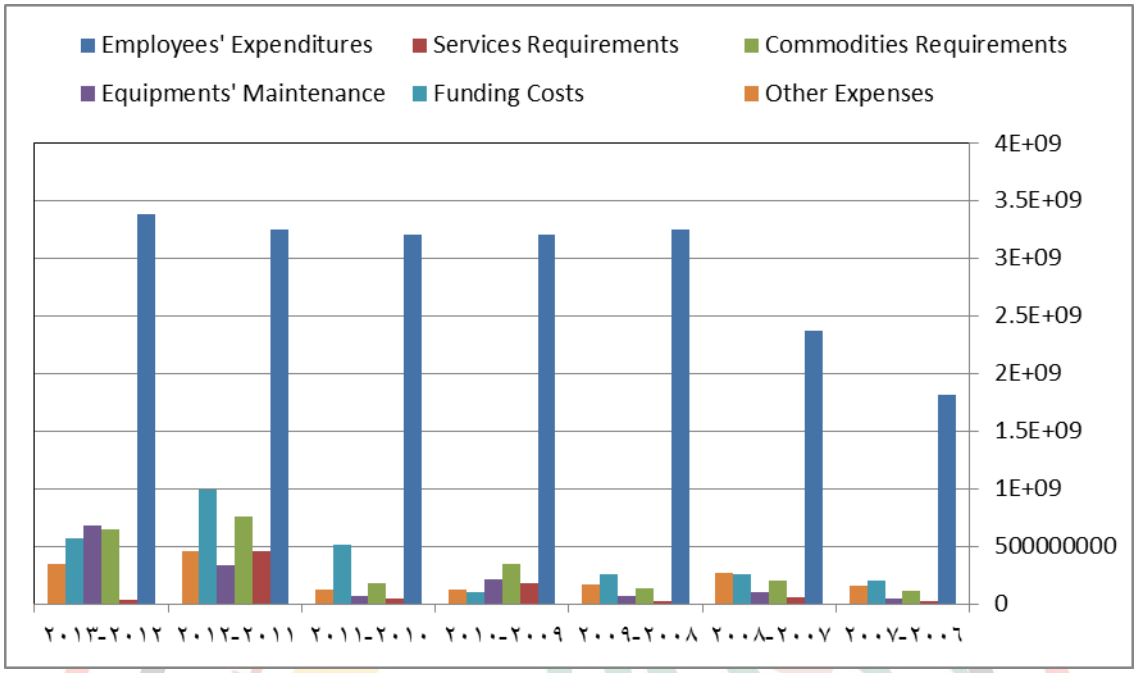
6. Other expenses: students and unofficially employed staff.

**Table 6.1** and **Fig. 6.1** summarizes all previous points.

**Table6.1: College of Engineering Budget Allocated by the University of Basrah over the Past seven Years**

| Allocations (ID) | Academic Year | | | | | | |
|---|---|---|---|---|---|---|---|
| | 2006-2007 | 2007-2008 | 2008-2009 | 2009-2010 | 2010-2011 | 2011-2012 | 2012-2013 |
| Employees' Expenditures | 1820250000 | 2377500000 | 3254470000 | 3203500000 | 3210250000 | 3256000000 | 3387000000 |
| Services Requirements | 20450000 | 56450000 | 26800000 | 177900000 | 46124380 | 455640000 | 34980000 |
| Commodities Requirements | 109300000 | 204009750 | 139400000 | 343600000 | 183487850 | 756567700 | 645585540 |
| Equipments' Maintenance | 42000000 | 104000000 | 71500000 | 215400400 | 70284200 | 334660000 | 677755000 |
| Funding Costs | 203200000 | 256000000 | 254750000 | 102300000 | 509848500 | 987756000 | 567890000 |
| Other Expenses | 153750000 | 273750000 | 164750000 | 126000000 | 125288250 | 456778800 | 346786600 |
| **Total** | **2348950000** | **3271709750** | **5166270000** | **5089400400** | **4145283180** | **6467887000** | **5927897400** |

**Fig. 6.1 College of Engineering Bugget**




## 6.2 Sources of Financial Support( من الكلية)

The college of engineering is a governmental institution that funds its activities from:

1. General governmental funds which represents the greatest portion of the budget.
2. Higher education fund which includes:
    a. Laboratorial tests: 65% of funds for test team, 15% for university, 16% for bonuses, and 4% for maintenance.
    b. Shops rent: 15% for university, 68% for bonuses, and 17% for maintenance.
    c. Continuous learning courses: 65% for course trainers, 15% for university, 16% for bonuses, and 4% for maintenance.
    d. Special courses: 65% for course trainers, 15% for university, 16% for bonuses, and 4% for maintenance.
    e. Industry cooperation: 80% for work team, 10% for university, 8% for bonuses, and 2% for maintenance.

f. Internet Center: 15% for university, 68% for bonuses, and 17% for maintenance.
g. Student registration fees: 80% for bonuses and 20% for maintenance.
h. Exams results objections fees: 80% for bonuses and 20% for maintenance.
i. Parallel teaching
j. Self-funding study master and doctorate fees: 50% for students, 25% for lectures, and 25% for other stuff.
k. Water desalination plant: 15% for university, 68% for bonuses, and 17% for maintenance.

**Table6.2** shows a sample of sources and their income.

**Table6.2: Sources and Revenue Sample**

| Item | Revenue ID |
|---|---|
| laboratories Tests | 739549000 |
| Shop Rents | 6850000 |
| Continuous Learning Courses | 11125000 |
| Special Courses | 9448000 |
| Industry Cooperation | 42693000 |
| Internet Center | 4625000 |
| desalination Plant | 2275000 |
| **Total** | **816565000** |

## 6.3 Community Service

The PeE department participates through the engineering consultation office in the college in giving consultation services in all fields for governmental and private sector agencies inside and outside Basrah.

## 6.4 Faculty Professional Development Support

The office of chancellor's assistant for scientific affairs, office of chancellor's assistant for management affairs, department of planning and continuation, and the cultural affairs office in the University of Basrah participate in developing the college of engineering by offering short and long term scholarships for its master and doctorate students. Also, it offers deputations for faculty members. **Table6.4** lists the PeE deputation summary for the academic year 2015-2016.

**Table6.4: PeE Deputation Summary in 2015-2016**

| Faculty Name | Date and Location | Activity |
|---|---|---|
| Not Available | | |
| | | |

Doing the SWOT analysis, we get:

| | Helpful (to achieving the objective) | Harmful (to achieving the objective) |
|---|---|---|
| Internal origin (attributes of the department) | **Strengths**<br>- Due to the process of assigning budgets to universities and colleges, the department receives a guaranteed annual budget. | **Weaknesses**<br>- The department has no external financial resources - a drawback which needs to be solved. Sometimes, when the assigned annual budget is not enough, the chairman has to cut from the expenditures. |
| External origin (attributes of the | **Opportunities** | **Threats**<br>- There is not depart Deputations are assigned to professors or any persons in charge. |