**Multi-disciplinary Professional Diploma**

“**Natural Gas Industry**”

**“PROGRAM SPECEFICATION”**

* **Basic Information**

**Program name: Multi-disciplinary Professional Diploma in** *“Natural Gas Industry”*

**Program nature:** Continuing Education in Natural Gas Industry and Technology

**Department offers the program:** Multi-disciplinary Professional Diploma

**Date of specification approval:**

* **Specific Information**

1. **Introduction**

The program format is directly comparable to the postgraduate diploma offered by the Faculty of Engineering at Cairo University. It is open to candidates who already have B.Sc. in Science. As such, it is particularly suited to non-engineers working in the field of Natural Gas Industry and aim to become familiar with the engineering practice related to their profession.

**The Certificate awarding the post graduate degree is granted indicating the title of the Diploma. The statement “Professional Diploma” is mentioned explicitly preceding the title of the program “Natural Gas Industry”. The awarded certificate does not, by any means, qualify the graduate for registration in any of the post graduate academic degrees in the engineering sector.**

1. **Program Mission**

The purpose of this program is to supply the Egyptian market with non-engineering candidates familiar with basic elements of Natural Gas Industry. Graduates will be able to develop career in NG industry.

1. **Program Objectives**

The proposed program has four main educational objectives. These can be summarized as follows:

The program aims to:

1. Provide a study opportunity which enables the candidates to acquire basic knowledge and understanding of Industry fundamentals relevant to NG Industry profession.
2. Develop the appropriate intellectual skills required to help graduates to plan, design, analyze, execute and manage industrial NG projects.
3. Provide candidates with the practical and professional skills necessary for employment in the field of NG Industry and related fields.
4. Develop communication skills necessary for the profession that enable the graduates to work in multi-disciplinary teams and interact properly in the professional environment.
5. **Program Admission Requirements:**

The minimum entrance qualification is a B.Sc. in Science, such: as geosciences, physics, chemistry or geology ... from any Egyptian university or its equivalent from any academic institution approved by the Egyptian Supreme Council of Universities. Registered students should dedicate at least two days per week for attending the Professional Diploma courses.

1. **Graduate Attributes**

A graduate of the Professional Diploma in “Natural Gas Industry” should be able to:

1. Apply professionally the acquired knowledge in NG Technology practice.
2. Master the professional skills and the use appropriate technological tools suitable for NG Technology.
3. Identify professional problems and propose appropriate solutions.
4. Communicate effectively and lead teams through systemic professional work.
5. Demonstrate decision making skills in the light of the available information.
6. Deploy available resources in NG Technology & relevant industries effectively.
7. Exhibit awareness of his role in community development and saving the environment.
8. Reflect commitment to integrity, credibility and ethics in NG profession.
9. Recognize the necessity of self development and engage in continuous learning.
10. **General Standards**

**Intended Learning Outcomes (ILOs)**

**6-1. Knowledge and Understanding:**

After completing the program, the graduate should be able to:

1. Demonstrate understanding of basics and fundamentals related to the area of “Natural Gas Industry and Technology”
2. Exhibit basic knowledge in Petroleum, Chemical, Mechanical and Electrical Engineering as related to NG Technology practice.
3. Recognize the impact of NG Technology practice on the environment.
4. Define the ethical and legal principles of NG Technology practice.
5. Describe the principles and fundamentals of quality control in NG Technology practice.

**6-2. Intellectual Skills:**

After completing the Professional Diploma program in Natural Gas Industry, the graduates should be able to:

1. Identify and analyze the data in the areas of Petroleum, Chemical, Mechanical and Electrical Engineering as related to NG Technology practice according to selected priorities.
2. Integrate knowledge from various engineering fields to solve NG Industry problems.
3. Perform preliminary research study and/or write scientific report about specific research problems in the field of NG Industry.
4. Plan to improve performance of operations and processes in NG Industry.
5. Make specialized decisions in various areas of the profession.

**6-3. Professional skills:**

After completing the Professional Diploma program in Natural Gas Industry, the graduates should be able to:

1. Illustrate basic skills and conduct field studies and troubleshooting in the field of Natural Gas Industry and relevant technologies.
2. Write and evaluate professional reports in the field of Natural Gas Technology.
3. Assess existing methods and tools in the area Natural Gas Industry.

**6-4. General and transferable skills:**

The graduate should be able to:

1. Communicate effectively in different forms.
2. Use IT to serve the development of professional practice.
3. Self-evaluate and determine personal educational needs.
4. Use different sources for acquiring information and knowledge.
5. Join efficiently in teamwork and manage time effectively.
6. Lead a team in a professional context.
7. Adopt continuous and self learning.
8. **Teaching and learning methods:**

* Lectures
* Practical classes
* Guided Self-reading
* Mini-research projects
* Interactive discussions
* Case studies
* Site visits

1. **Assessment Methods:**

* Written Examination
* Course work submission
* Short tests
* Oral presentations
* Individual project reports

1. **Structure and Components of the program:**
2. **Program period: 2 years – 4 semesters.**
3. **Structure: As indicated in the Faculty Post Graduate By-laws. The program is comparable to the Natural Gas Engineering Diploma offered by the Faculty of Engineering at Cairo University.**
4. **The program is a multi-disciplinary professional diploma specialized in Natural Gas Industry. It is open to candidates, who already have B.Sc. in Science, such: as geosciences, physics, chemistry or geology ... from any Egyptian university or its equivalent from any academic institution approved by the Egyptian Supreme Council of Universities. The awarded certificate does not, by any means, qualify the graduate for registration in any of the post graduate academic degrees offered by the Faculty of Engineering – Cairo University or any other Faculty in the Engineering Sector. Furthermore, the certificate awarding the post graduate degree does not allow the graduates (Professional Diploma Holders) to apply for membership in the Syndicate of Engineering.**
5. **The number of credit hours required to complete this professional diploma program is 20 credit hours distributed among 10 courses from the undergraduate level (level 400 courses) and academic diploma level (500 level courses).**
6. **General Rules and Regulations**

The general rules for progression and completion of the program followthe Faculty Post Graduate By-laws, as indicated here-in-after:

**Steering Committee: In accordance with** (Clause 22)

The Professional Diploma in Natural Gas Industry is a multi-disciplinary diploma implemented under the supervision of a steering committee, with the membership of the Faculty Vice-dean for post graduate affairs, the Program Main Coordinator (Dr. El-Sayed El-Tayeb – Professor at the Petroleum Engineering Department), the Program Executive Coordinator (Dr. Sahar El-Marsafy – Professor at the Chemical Engineering Department) in addition to a number of staff members (nominated by the Program Main Coordinator among those participating in teaching in the professional diploma) and of representatives of the Petroleum and Natural Gas Industry from the leaders of the Oil and Gas Sector (selected by the Program Main Coordinator from EGPC, the sector’s Holding Companies and affiliates). The main duty of this steering committee is to run the diploma, implement the rules and regulations mentioned in this curriculum and form a link between the requirements the industrial establishments relevant to the oil and gas sector and the post graduate affairs department in the Faculty.

**Duration of Study: In accordance with** (Clause 27)

The time required to attain the Postgraduate Diploma shall not exceed four main semesters if the student is registered as a part-time student. The Faculty Council may approve, upon the proposal of the Steering Committee, the duration of study to be two main semesters only provided that he/she is enrolled as a full-time student.

**Study Requirements: In accordance with** (Clause 28)

The minimum credit hours for the Multidisciplinary Postgraduate Professional Diploma in NG Industry shall not be less than 20 hours of courses of level 500 as indicated in the program courses here-in-after. A qualifying course; namely; "Introduction to Petroleum, Chemical, Mechanical and Electrical Engineering" shall count as part of these credit hours.

**Attendance: In accordance with** (Clause 16)

A student is ineligible to sit for exam in any course unless he/she attends at least 75% of the lectures. This procedure shall be based on a report from the course instructor to the Main Coordinator, approved by the Graduate Studies Committee and the Faculty Council.

**Registration Cancellation: In accordance with** (Clause 30)

The student's registration is cancelled in any of these cases:

1. If he/she fails a course twice.

2. If he/she does not pay the fees on time.

3. If he/she submits a request for withdrawal in accordance with Clause (14)

1. **Program Courses:**

**First Year (First term)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Code | Course Name | Credit hours | Maximum Grades | | | Duration of written Exam, hours |
| Course  work | Written  exam | Total |
| PNG 500 | Introduction to Petroleum, Chemical, Mechanical and Electrical Engineering | 2 | 20 | 80 | 100 | 2 |
| PNG 502 | Gas Reservoirs | 2 | 20 | 80 | 100 | 2 |
| PNG 505 | Instrumentation and control | 2 | 20 | 80 | 100 | 2 |

**First Year (Second term)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Code | Course Name | Credit hours | Maximum Grades | | | Duration of written Exam, hours |
| Course  work | Written  exam | Total |
| PNG 501 | Fundamentals of Electrical Engineering | 2 | 20 | 80 | 100 | 2 |
| PNG 503 | Production Technologies | 2 | 20 | 80 | 100 | 2 |
| PNG 504 | Measurements, Transportation & Storage | 2 | 20 | 80 | 100 | 2 |

**Second Year (First term)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Code | Course Name | Credit hours | Maximum Grades | | | Duration of written Exam, hours |
| Course  work | Written  exam | Total |
| PNG 506 | Separation & Purification | 2 | 20 | 80 | 100 | 2 |
| PNG 509 | NG Utilization | 2 | 20 | 80 | 100 | 2 |

**Second Year (Second term)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Code | Course Name | Credit hours | Maximum Grades | | | Duration of written Exam, hours |
| Course  work | Written  exam | Total |
| PNG 507 | Natural Gas Processing | 2 | 20 | 80 | 100 | 2 |
| PNG 508 | Petrochemical Processes | 2 | 20 | 80 | 100 | 2 |

1. **Contents of Courses**

**Introduction to Petroleum, Chemical, Mechanical and Electrical Engineering (PNG 500)**

This introductory course is tailored for non-engineering students aiming to familiarize them with different fields of engineering and introduce to them various problem solving techniques employed by engineers. It also introduces the engineering profession through thefundamentals of engineering problem-solving including skills from mathematics, science, and computing in the field of petroleum, chemical, mechanical and electrical Engineering to the students. Introduction to petroleum, chemical, mechanical and electrical engineering. Ethics and legislation - technical writing - field visit.

**Fundamentals of Electrical Engineering (PNG 501)**

Electrical circuits- Electronic circuits- Power and energy – Power factor - Power Quality- Electromechanical Energy Conversion- Electromagnetic- Protection systems- Earthing and grounding systems- Cathodic protection- Environmental effects of electromagnetic - Ethics and legislation - technical writing - field visit.

**Gas Reservoirs (PNG 502)**

Properties of natural and condensate system, gas in place, calculations of gas and gas condensate reserves, reservoir performance, Ethics and legislation, technical writing, field visit.

**Production Technologies (PNG 503)**

Introduction, well performance, static and flowing bottom hole pressures, tests of gas wells, transient flow of real gases through porous media, gas field development, Ethics and legislation, technical writing, field visit.

**Measurements, Transportation & Storage (PNG 504)**

Pipelines Installation, Pipelines Operation & Maintenance, Instrumentation, Pipeline Monitoring, Ethics and legislation, technical writing, field visit.

**Instrumentation and control (PNG 505)**

Automatic control principles- open loop control- Closed loop Control- Elements of control systems - Digital logic Circuits- Fundamentals of Programmable Logic Controllers (PLC) – Sensors- Measurement Instruments- Electronic measurements- Signal analysis- Signal conditioning- Signal processing- Fundamentals of Supervisory Control and Data Acquisition (SCADA), Ethics and legislation, technical writing, field visit.

**Separations & Purification (PNG 506)**

Classification of oil and separators. Estimating sizes and capacities of separators, absorption and adsorption, sulfur removal, dehydration, Ethics and legislation, technical writing, field visit.

**Processing of Fractionation (PNG 507)**

Cryogenics and treating, liquefaction of Natural gas, separation of LPG, Separation of ethane, Ethics and legislation, technical writing, field visit.

**Petrochemical Processes (PNG 508)**

Steam reforming of natural gas – hydrogen- methanol - ammonia - urea-steam cracking of ethane – ethylene - Ethylene Derivatives – Polyethylene – Poly Vinyl Chloride- Petrochemicals from propane-Petrochemical from butane-Chemical liquefaction of natural gas - Ethics and legislation - technical writing - field visit.

**NG Utilization (PNG 509)**

Thermodynamics concepts, NG Processes facilities, cycles, I.C.E, Turbines, Compressors, Heat Exchanges, Ethics and legislation, technical writing, field visit.

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