Chemical Engineering Program Report

(2023-2024)

Content

1. Basic Information

- **Program title:** Chemical Engineering
- **Program type:** Single.
- **Department offering the program: Chemical Engineering**
- **Co-coordinator**:
  Assoc.Prof. Hasan Barakat (Head of Chemical Engineering)
  Assistant Coordinator: Assoc.Prof. Ghada kadry
  External evaluators:
  Prof. Mai Mohamed Kamal El Din Sayed Ahmed Fouad
- **Year of operation**: 2023-2024
- **Number of years of study:** The duration of the program is five academic years, including the preparatory year
- **Number of theoretical hours & number of practical hours:**

Lecture hours : 121 hours – tutorial hours : 79 hours - practical hours : 50 hours

- **The formation of committee's examiners:** The examiners are selected according to the specialization as in the levels from preparatory to 3rd level, the two of the examiners are selected for each course, while in the 4th level is three examiners.
- **System of external examiners:** The external examiners are selected according to the specialization.

2. Professional Information

2.1. Statistics

- No. of students starting the program (admitted at 2020-2021): 18
- Ratio of students admitted to the program this year (2023-2024) to those of last year (2022-2023) = 39 / 14*100 = 278.5 % (Increase)
- No. and percentage of students passing in each year/level/semester

Table (1): No. and percentage of students passing in each year/level/semester

Year		Number of students	No of passing Students	Percentage of passing %
First	2020-2021	18	13	72
Second	2021-2022	13	12	92
Third	2022-2023	12	11	92
Fourth	2023-2024	11	10	91

- No. of students completing the program and as a percentage of those who started:
  10/ 18 *100= 56 %
- Grading: No. and percentage in each grade

Academic year	Number	Percentage %
students joining the program on Sept 2020	18	100
students completing the program at May 2024	10	56
students completing the program at Sept 2024	-	-
Total Number of students completing the program in 2023-2024	10	56

No. and percentage of students passing in each grade 4th year

Year	Excellent		V. good		Good		Pass		Failed	
	No.	%	No.	%	No.	%	No.	%	No.	%
4th year* 2023-2024 **(11)**	-	-	5	45.45	5	45.45	-	-	1	9.09

- First destinations of graduates:

i. Proceeded to appropriate employment %	Not available
ii Proceeded to other employment %	Not available
iii Undertaken postgraduate study %	Not available
iv. Engaged in other types of activity %	Not available
v. Unknown first destination %	Not available

"Employment rate of Chemical Engineering program graduates up to 2023-2024."

Number of graduates								
The number of " graduates who responded to the Students and Alumni ".Committee	Joining the labour market as engineers		Joining the labour market in other professions		Has not joined the labour market			
					Performing military service		Unemployed	
	"Number "	Percentage %	Number	Percentage %	Number	Percentage %	Number	Percentage %
218	193/196	98	5/196	2.5	12/218	5.5	10/218	4.5

2.2. Academic Standards

2.2.1. Achievement of program learning outcomes, LOS:

Prep. Year Chemical Engineering

Code	Course Name	program learning outcomes, LOS		
		A	B	C
PHM 011	Mathematics (1)	A1.1, A1.3, A2.2	-	-
PHM 013	Physics (1)	A1.1, A1.3, A2.2	-	-
PHM 015	Mechanics (1)	A1.1, A1.2, A1.3, A2.2, A10.2	-	-
ARC 011	Engineering drawing& Projection (1)	A1.2, A1.3, A2.2, A3.4, A4.1,A8.2, A9.1, A10.2	-	-
CHE 011	Chemistry (1)	A1.1, A2.2, A3.3	B1.1	-
HUM 013	ICDL	A1.1, A2.1, A3.4, A10.2	-	-
HUM 011	Technical English language (1)	A7.1, A8.1, A8.2, A9.2, A10.2	-	-
PHM 012	Mathematics (2)	A1.1, A1.3, A2.2, A2.3	-	-
PHM 014	Physics (2)	A1.1, A1.3, A2.2	-	-

Code	Course Name	program learning outcomes, LOS		
		A	B	C
PHM 016	Mechanics (2)	A1.1, A1.3, A2.2, A10.2	-	-
ARC 012	Engineering drawing & Projection (2)	A1.1, A1.3, A2.2, A3.4, A8.2	-	-
PHM 017	Production Technology	A3.3, A4.2, A8.1 ,A10.2	-	-
Hum 014	History of engineering and technology	A3.3, A4.2, A5.1, A7.1, A10.2	-	-
HUM 012	Technical English language (2)	A3.4, A7.1, A8.1, A8.2, A10.2	-	-

1st year Chemical Engineering

Code	Course Name	program learning outcomes, LOS		
		A	B	C
CHE 121	Inorganic chemistry	A1.1, A1.3, A2.2, A10.1, B1.1	-	-
CHE 131	Introduction to chemical engineering and petroleum processing	A2.2	B1.3, B2.1, B4.2	-
PHM 171	Mathematics (3)	A1.1, A1.3, A2.2, A2.3, A9.1	-	-
PHM 173	Physics (3)	A1.1, A2.1, A2.2, A7.1, A8.1	-	-
CHE 151	Machine design	-	B1.2, B1.3, B1.5, B3.1, B4.2	-
HUM 171	Industrial psychology	A1.1, A1.2, A3.1, A3.3, A4.1, A7.1	-	-
	International relations	A3.1, A3.3, A4.1	-	-
HUM 172	Technical report	A3.4, A5.1, A8.1, A8.2	-	-
CHE 122	Organic chemistry(1)	A1.1, A1.2, A2.1, A2.2, A2.3, A7.1, A8.1, A10.2	-	-
CHE 123	Inorganic and analytical	A1.2, A2.1, A2.2, A2.3, A8.1	B1.1	-
PHM 172	Mathematics (4)	A1.1, A1.3, A2.2, A2.3, A9.1	-	-
PHM 174	Mechanics (3)	A1.1, A1.3, A2.1, A2.2	B1.2	-
CVE 112	Principles of Construction Engineering	A1.1, A1.2, A2.2, A2.3, A4.2, A6.1, A7.1, A10.2	B1.2	-

Code	Course Name	program learning outcomes, LOS		
		A	B	C
EPM 116	Electrical and Eletronic Engineering	A1.1, A1.2, A1.3,	B1.3, B3.1	-
HUM 173	Industrial Safety ans Risk Analysis	A1.1, A2.2, A4.2, A10.2	-	-
	تشريعات وعقود والكميات والمواصفات	A3.1, A3.2, A3.3, A8.1	-	-
	البيئة وخدمة المجتمع	A3.1, A3.2, A8.1	B4.1	-

2nd year Chemical Engineering

Code	Course Name	program learning outcomes, LOS		
		A	B	C
CHE 221	Momentum transfer (1)	A1.1, A1.2, A7.1	B1.1, B1.2, B1.3, B1.5	-
CHE 231	Momentum transfer	A1.2	B1.3, B3.2	-
CHE 222	Physical Chemistry and Thermodynamics	-	B1, B2,B3	-
CHE 232	Fundamentals of Mass and Energy Balance	A1.3	B1.3, B1.5,B3.1,B3.2	-
HUM 271	History of Nuclear Engineering	A1.3, A4.2	B1.3, B4.1	-
HUM 272	Research and analysis skills	A5.1, A8.1, A8.2	-	-
CHE 223	Physical chemistry and phase equilibrium	A1.1	B1.2, B1.3	-
CHE 224	Organic and Biochemistry (3)	A1.1, A1.2, A1.3, A2.1, A7.1, A10.1	B1.1, B1.2,B1.3, B2.1, B4.1	-
PHM 271	Probabilities and Statistics	A1.1,A1.2,A2.2,A2.3,A9.1	-	-
CHE 233	Principles of Mechanical Engineering	A1.1, A1.3, A3.3	B3.1	-
CHE 2XX1	Renewable Energy Resources engineering	-	B2.1, B3.1,B4.1	-
	solid waste management	-	B1.1, B1.2, B4.1, B4.2	-
	water treatment	-	B1.1, B1.2,B1.3, B1.5, B2.1, B4.1	-
HUM 273	Elective huminity course Strategy Planning	A2.1, A2.2,A4.1, A4.2	-	-
HUM 274	Evaluation of environmental impacts	A1.1,A1.2, A2.1, A3.1, A4.2, A9.1, A10.1	-	-

3rd year Chemical Engineering

Code	Course Name	program learning outcomes, LOS		
		A	B	C
CHE 371	Mechanical unit Operations	A3.3, A10.1	B1.3, B4.2	-
CHE 361	Organic chemical industries	A3.2, A3.4, A5.1	B1.1, B1.2, B1.3, B1.5, B2.1, B4.1	C1, C2
CHE 362	Inorganic chemical industries	A3.3	B1.1, B1.2, B1.5	-
CHE 331	Heat transfer and it's application	-	B1.3, B1.5, B2.1, B4.1	-
CHE 341	Applied Electrochemistry and corrosion engineering	-	B1.2, B1.3, B1.5, B2.2, B4.2	-
HUM371	Project Management	-	B4.1	C2, C3
CHE 342	Material Science and new materials	-	B1.2, B1.3, B3.1, B3.2, B4.1	-
CHE 363	Polymer Engineering	A2.2, A5.1	B1.1, B1.2, B1.3, B2.1	-
CHE 364	High Temperature Industries	A9.1	B1.1, B1.2, B1.3, B1.5, B2.1, B2.2, B3.1	-
CHE 351	Modeling and simulation in Chemical Engineering	A1.1, A3.4	B1.3, B3.1, B3.2	-
CHE $3XX_2$	Petrochemical	A5.1	B1.1, B1.4, ,B2.1	-
	Biochemical industry	-	B1.2, B1.3, B1.5, B2.1, B4.2	-
CHE 3YY	Practical field training(1)	A3.4, A4.2, A8.2	B1.3, B2.1, B3.1	-

4th year Chemical Engineering

Code	Course Name	program learning outcomes, LOS		
		A	B	C
CHE 431	Mass transfer and multi-stage separations (1)	-	B1.3, B3.2, B4.2	-
CHE 491	Petroleum Refining Engineering	-	B1.4	C1,C2,C3
CHE 451	Chemical reactor and vessel Design	-	B1.3, B1.5, B4.2	-
CHE 452	Process and plant design	-	B1.3, B1.5, B4.1	C3
CHE 453	Lab of Chemical Engineering	A5.1, A8.1	B1.2, B1.5, B2.2, B3.1	-

Code	Course Name	program learning outcomes, LOS		
		A	B	C
CHE 4ZZ	Graduation project(1)	A1.1, A5.1, A7.1, A8.1, A9.1, A9.2, A10.1	B1.5, B2.2, B4.1, B4.2	-
CHE 4ZZ	Graduation project(2)	A1.1, A5.1, A7.1, A8.1, A9.1, A9.2, A10.1	B1.5, B2.2, B4.1, B4.2	C1, C2, C3
CHE 4YY	Practical field training(2)	-	B1.3, B1.5	C1, C2, C3
CHE 432	Mass transfer and multi-stage separations (2)	-	B1.3, B2.1, B4.2	-
CHE 454	Process control	-	B1.2, B1.3, B3.1, B3.2	-
CHE 455	Economics of Chemical Plants	-	-	C2, C3
CHE 481	Environmental engineering	A3.2	-	C2, C3
CHE 4XX3	Fertilizer technology	-	-	C1,C2,C3
	Natural gas Engineerin	-	B1.4	C2, C3
	Advanced Modeling & simulation in chemical Engineering	-	B1.2, B1.3, B3.1, B3.2	-
	Nuclear and Radiation engineering	-	B1.1, B1.2, B1.3, B2.1, B3.1, B4.1	-

Regarding the previous table, we observe the achievement of program intended learning outcomes to cover all courses taught.

- **Comments of external evaluator and other stakeholders**

a- Comments of stakeholders

The courses of the chemical engineering program are sufficient to enhance the skills of the graduates to cope with the job market requirements. In addition, graduates improve the practical and professional skills through the Practical field training courses (Appendix 1)

b- Comments of evaluator (Appendix 2 in program specification)

See attached external and internal evaluator report (Appendix 2 in program specification)

2.3. Achievement of program aims

By reviewing the achievement of program aims covered by the achievement of the different educational aims in the courses, which vary according to the educational purpose of the course we totally observed the achievement of program aims which are:

1.1 Apply knowledge and advanced technical skills in chemical engineering.
1.2 Utilize and manage resources creatively through effective analysis and interpretation skills.
1.3 Recognize the potential and applicability of computer-based methods in chemical engineering design.
1.4 Address the issues of process dynamics and control in plant operation .
1.5 Plan and execute research work, evaluate outcomes, and draw conclusions .
1.6 Identify and control the impact that chemical engineering has on society from an environmental, economic, social, and cultural point of view.

2.4. Assessment methods

For the first semester

Commentary (quoting evaluations from external evaluator and other stakeholders)

The assessment methods used in the program courses were as following:

1. Written Exams (class exams, mid-term, and final exam).
2. Practical exams especially for Lab courses.
3. Oral exams for the project, Lab courses and some other courses.
4. Written reports
5. Lab. Activities
6. Sheet and report
7. Discussion
8. E- learing Quizes/ activity
9. E-Learning mid term exam

The current assessment methods of the program course considered quite appropriate due to the small number of students enrolled in this program. These methods measure the program ILO's with reasonable accuracy.

2.5. Student achievement

Graduated Students achievement through the program

Students passing percentage	
Year	Percentage %
1St Year (2020-2021)	72
2nd Year (2021-2022)	92
3rd Year (2022-2023)	92
4th Year (2023-2024)	91

The percentage of students completing the programs and graduating this year as referred to the admitted students is around 100% which is considered a good achievement.

2.6. Quality of teaching and learning

Comments of external evaluator (Appendix 2 in program specification) in 2021-2022 and all of these comments were recovered and other the alumni-student-stakeholders questionnaire (Appendix 1) including students

- "Visit for accreditation and quality assurance for the Chemical Engineering program under the program accreditation for the academic year 2022-2023"
- "The Chemical Engineering program received program accreditation for the academic year 2022-2023"
- The corrective actions are attached (Appendix 1)

External evaluator 2022

1. Basic Information about the Program:
   - There is a program guide that includes clear objectives and is distributed to most students.

Additionally, the institute has a website that includes these objectives.

2. Program Objectives:

- The program's objectives are clearly defined within the framework of the National Academic Reference Standards (NARS). There is a matrix of targeted learning outcomes for the program that is integrated with the learning outcomes of the courses and is aligned with the courses in the institute's regulations, which are guided by the Chemical Engineering program regulations at the Faculty of Engineering, Cairo University.

3. Targeted Learning Outcomes of the Program:

- The targeted learning outcomes are related to the program's objectives and align with the graduate specifications. They keep pace with scientific developments and labor market needs and are achieved through the courses to a good extent.
- There is repetition in P8 and P9 of the targeted learning outcomes related to practical and professional skills (The internal review committee reviewed the targeted learning outcomes, and the department council made the appropriate adjustments as of the department council meeting on 10/2017).

4. Academic Standards:

- The program is based on the National Academic Standards for Engineering Studies issued by the National Authority for Quality Assurance and Accreditation, which include that upon successful completion of the program, the graduate should have the following specific characteristics in addition to the general qualities expected of an engineer:
  - A strong scientific background in mathematics and related sciences.
  - Ability to utilize and manage resources through analysis and interpretation.
  - Ability to respond to changes and developments in the use and application of computer-aided design methods, proficiency in English, and use of the internet for accessing specialized information.
  - Apply fundamental information in chemical industries.
  - Design and conduct research, evaluate results, and reach specific conclusions.
  - Link chemical reactions and their properties to industrial processes.
  - Develop practical and safe laboratory work skills.
  - Apply information and skills to respond to rapid technological changes.
  - Awareness of the technical, economic, social, and cultural impacts of chemical engineering on society and how to manage them.
  - Taking on responsibilities and challenges faced by chemical engineers and their relation to professional ethics.
  - The program adopted the Chemical Engineering Department regulations from Cairo University as a reference benchmark.

5. Program Structure and Content:

- The program structure is balanced with the graduate specifications and aligns with national academic standards.

6. Student Assessment:

- The methods and techniques for assessing students are appropriate for the nature of the targeted learning outcomes.

External Reviewer's Name: Prof. Dr. Mai Mohamed Kamal El-Din Ahmed Fouad

Signature:

External evaluator 2021

The regulations were reviewed after implementing the modifications outlined in the previous review report dated March 2017, and the following has been observed:

- Errors in course names were corrected to ensure consistency between the course descriptions in the program description and the course syllabus.
- The list of humanities elective courses for the first semester of the first academic year, which was previously missing from the regulations, was specified.
- Elective courses HUM1XX, CHE3XX1, CHE3XX2, HUM3XX, CHE4XX3, CHE4XX4, CHE4XX5, and CHE4XX6, which were previously missing, were identified along with their descriptions.
- A mechanism for academic advising on industrial training was established.
- Errors in the program description and course descriptions were reviewed and corrected.

It is evident that all required modifications have been completed.

Name of the external reviewer: Prof. Dr. Mai Mohamed Kamal El-Din Ahmed Fouad
Signature:

Internal Review Committee's Opinion

- **Basic Information**: The basic information, including the program name and approval date, is complete and consistent with the internal regulations.
- **Program Objectives**: The general objectives of the program are clearly defined and contribute to meeting the graduate specifications. However, the program objectives matrix should be reviewed against the NARS 2018 graduate specifications.
- **Learning Outcomes**: The learning outcomes cover all cognitive and skill-based learning areas and are well-formulated using SMART criteria.
- **Academic Standards**: The program's academic standards are specified and are met through the educational outcomes detailed in the program description (review of the academic standards/outcomes matrix).
- **Benchmarks**: Program benchmarks are defined and available.
- **Program Structure and Content**: The program structure and components are complete:
    - The program duration is defined.
    - The program structure is specified: credit hours / credit points / semesters / academic years.
    - Number of hours and field training are defined.
- **Course Descriptions**: The program courses are specified for each semester/year/level and achieve the educational outcomes outlined in the program description (review of the matrix).
- **Learning Outcomes**: The learning outcomes are appropriate and sufficient to achieve the program's objectives and are consistent with the course descriptions.

- **Assessment Methods**: The assessment methods are varied, suitable for achieving the learning outcomes, and aligned with the course descriptions. They include distance learning and electronic assessment methods.
- **Program Evaluation**: The evaluation methods are diverse and well-defined.
- **Previous Reviews**: Previous external and internal review reports have been utilized.
- **Program Description Approval**: The program description is approved by the program director, with the need to document the date of the department council's approval of the description.

A. **A survey was conducted to measure the level of satisfaction of employers and recruitment agencies regarding the graduate specifications and skills across different programs (Form 23)**

The number of institutions and companies contacted was 85. Out of these, 42 companies responded with valid feedback. The results were as follows:

Indicators	Percentage of satisfaction %
Graduates of the institute have been adequately prepared to undertake the responsibilities of their roles.	89
Graduates of the institute have been sufficiently prepared in scientific, practical, and general cultural aspects.	86
Level of satisfaction with the graduate's qualifications and skills.	91
Their academic experience is primarily theoretical and practical	81
The ability of the institute's graduates to perform roles similar to those of graduates from other universities	97
Graduates of the institute show a degree of diligence and flexibility in their self-development.	87
In general, I believe that the level of their specialized qualification is high	82
Degree of their communication with others	94

The labor market needs in new specializations include nuclear energy, in addition to fields that support artificial intelligence.

Corrective Actions:

- A specialized elective course in Nuclear and Radiological Engineering with code CHE4XX3 has been introduced for the fourth-year students in the Chemical Engineering program.
- A course titled "Introduction to Nuclear Engineering" with code HUM271 has been introduced for second-year students.
- Optional training for second- and third-year students has been arranged with the Nuclear Energy and Resources Authority.

B - A survey was conducted to determine the professional needs of the labor market across different programs (Form 24):

- **Institutions and Companies Contacted via Personal Interviews:** 26 companies were contacted, and the results were as follows:
    - 66% confirmed the importance of English as a fundamental requirement for all programs, which is addressed through English language courses in the preparatory year.

Institutions and Companies Contacted via Electronic Survey (Google Form): 80 companies were contacted, with 42 providing valid responses. The results were as follows:

- 66% confirmed the importance of English compared to other languages, with French at 25% and other languages at even lower percentages as fundamental requirements for all programs. This need is addressed through English language courses in the preparatory year.

Additionally, companies over the past two years have emphasized that the nature of an engineer's work relies on design, supervision, maintenance, and programming, as follows:

Nature of Engineering Work Required by the Labor Market:				
Type	Design	Supervision	Programming	Maintenance
Percentage%	100	100	0	100

Key Specialized Programs Required in the Labor Market:

Key Specialized Programs in Demand	Courses that Provide	Key Skills Required	Availability in the Program
Aspen HYSYS	Modeling and Simulation Course for Third-Year Students	Proficiency in Using the Program and Ability to Innovate and Develop	A complete course with periodic and final examinations
Aspen Plus	field training (Optional)	Communication	Teaching and Learning Methods Used, Assessment, and Projects
Process Safety Elements	Industrial Security and Risk Analysis Course	Problem-Solving Ability	Teaching and Learning Methods Used, Assessment, and Projects

The Alumni 2022-2023*

Measurement Axis	Graduates' Satisfaction Percentage
Your scientific and professional level in your field of specialization is satisfactory	%82
The courses you studied support self-learning skills	%75
The educational programs provided by the institute meet labor market needs	%82
Educational Effectiveness	%79
Institutional Capability	%84
Average	%82

The results of the survey have been utilized, and the program management has taken the following steps:

- **Expand and Equip Laboratories**: Continue expanding and equipping laboratories with the necessary laboratory devices according to the lab development plan.
- **Communicate with the Institute's Administration**: Inform the institute's administration about the results of the graduate surveys and continue preparing for employment forums.
- **Continue Offering Training Opportunities and Field Visits**: Provide ongoing training opportunities and organize field visits.
- **Inform Faculty Members**: Share the results of the graduate surveys with faculty members to understand the reasons behind them and contribute to enhancing educational effectiveness.

The graduate survey on educational effectiveness and institutional capability has been replaced with the graduate's opinion on labour market needs.

2.7. Effectiveness of student support systems

Commentary on both academic and pastoral/personal support for all students

The department is interested in the students' support, through the following:

- Divide the students of the same level into two sections (each section 20 students) and distribution the studying schedule to optimize the use of lecture halls and lab. rooms

A system was developed to solve the problems of students through the distribution of the responsibility on the faculty members to quickly resolve the problem and follow-up the complaints and to respond in a specific period.

- The periodic meeting with students' representatives to solve problems of students.
- There is final revision for the studied courses at the end of each semester to assist low and middle caliber students.
- Students are helped in the case of special circumstances such as cases of the disease, the death of a parent, or injuries during an incident, by considering the circumstances of each case in providing the requirements of this year, especially in materials that rely on semester marks and attendance.

2.8. Learning resources

A. No. and ratio of faculty members and their assistants to students

- No. of students= 39+14+23+11=87
- No. of program faculty members = 6
- No. of program Faculty out posted members* =11/(0.5) ≈5 (تم حساب أعضاءهيئة التدريس المنتدب داخلى وخارجى)
- Total No of program members = 6+5 =11
- No. of program faculty member assistants =3
- No. of program faculty members and their assistants = 14
- No. of faculty members / No. of students = 11/87 (about one faculty for 8 students)
- No. of faculty members and assistants / No. of students =14/87 (about one faculty for 6 students)
- No. of faculty assistants / No. of students =3/87 (about one assistant for 29 students)

و هي لا تتوافق مع ال NORMS و يتوافر خطة لزيادة الإمكانيات البشرية (Appendix 8)

B. Matching of faculty members' specialization to program needs.

There are sufficient faculty members in each specialization to satisfy all program needs. (Appendix 1 in program specification)

C. Availability and adequacy of program handbook

There is a handbook for all B.Sc. programs offered by the faculty, including study Plans and courses' short description.

D. Adequacy of library facilities.

The faculty library is adequate, due to the sufficient number of computers connected to the

internet, adequate space, adequate lighting, adequate ventilation, computerized search, with enough recent textbook copies.

E. Adequacy of laboratories

- The department has six laboratories.
- The infrastructure of the laboratories was developed, and new benches were added
- Laboratories are suitable and constantly developing (look to Appendix 8)

F. Adequacy of computer facilities

- The available computer labs are adequate compared to the number of students. Computer facilities are adequate.
- Internet access is now available for faculty staff and students through a wireless network covering the building where the department rooms exist.

G. Adequacy of field/practical training resources

- Mandatory Training for Second-Year Students: Wastewater treatment and well analysis at Madinaty by Talaat Moustafa Group (TMG) (13 students).
- Mandatory Training for Third-Year Students: At Galaxy Chemicals Company (23 students).
- Optional Training for Fourth-Year Students: At Helwan Fertilizers Company (11 students).

H. Adequacy of any other program needs: -

2.9. Quality management

A. Availability of regular evaluation and revision system for the program

- Every 5-year curriculum is revised and updated (Appendix 2 in program specification- Appendix 4 program report)
- Students questionnaire and Alumni (Appendix1)
- Stakeholders questionnaire (Appendix1)
- Exernal and internal evaluation system for the program is set (Appendix 2 in program specification)
- Evaluation of exam papers (Appendix 3)
- Improvement plan (Appendix 4)

B. Effectiveness of the system

The quality management system is effective since there are:

- Quality management regulations.
- Feedback for the program evaluation.
- Corrective actions for program flaws.

C. Effectiveness of Faculty and University Laws and Regulations for Progression and Completion

- All the actions of the last report were applied neatly and were very effective for the system.

D. Effectiveness of program external evaluation system:

I- External evaluators (Appendix 2 in program specification)

One qualified external evaluator evaluates the department program. (Prof. Dr. Mai Kamal El-Sayed from March 2017 then in September 2021,

External Evaluators	Date of review	Action
Prof. Dr. Mai Mohamed Kamal Alden El-Sayed	March 2017	All comments were covered
	September 2021	All comments were covered
	July 2023	Approval of the program's competencies analysis into proposed knowledge outcomes and skills.
Accreditation and Quality Assurance Visit for the Chemical Engineering Program	The Academic Year 2022-2023	The Chemical Engineering Program received program accreditation for the academic year 2022-2023
Accreditation and Quality Assurance Visit for the Higher Institute of Engineering	The Academic Year 2023-2024	The academic and educational program standards and the education and learning standards were fully met.

II- Students

The program courses, the teaching methods and the assessment methods are evaluated by the students each semester by questionnaires handed to a percentage of students for each course. As for the alumni there is a questionnaire done to a percentage of them to evaluate the whole program. Appendix1

III- Other stakeholders

See Appendix1

All the questionnaires are discussed and used to improve the program as in appendix 5

E. Faculty response to student and external evaluations (See Appendix1)

All the external evaluator's comments were taken in consideration and are stated with the department response in the "Program Specification".

There is an action plan set to be implemented in the following academic year.

3. Proposals for program development

A. Program structure (units/credit-hours)

The program includes 65 courses of total 250 contact hours, these courses are classified according to the relevant sector NARS requirements to the following subject areas:

1. Humanities and Social Sciences
2. Mathematics and Basic Sciences
3. Basic Engineering Sciences
4. Applied Engineering and design
5. Computer Application and ICT
6. Projects and Practice
7. Selective Subjects

Total teaching hours and subject distribution over the subject areas chemical engineering

	Course teaching hours credit hour	Humanities & Social Sciences	Math & Basic Sciences	Basic Eng	Applied Eng & Design	Computer Appl & ICT*	Projects* & Practice	Selective course
Total prep year 1st Semester	25	2	17	3		3		
Total prep year 2nd Semester	25	4	13	3		5		
Total 1st year 1st Semester	24	5	8	8	3			
Total 1st year 2nd Semester	25	3	14	8				
Total 2nd year 1st Semester	26	6		19		1		
Total 2nd year 2nd Semester	24	6	5	9				4
Total 3rd year 1st Semester	25				16	3	4	2
Total 3rd year2nd Semester	24			4	5	5	5	6
Total 4th year 1st Semester	27				16	3	8	
Total4th year 2nd Semester	24				13	2	5	4
Total of Five Years	250	26	57	54	53	22	22	16
% of Five Years	100%	**10.4%**	**22.8%**	**21.6%**	**21.2%**	**8.8%**	**8.8%**	**6.4%**
NARS %	**100%**	**9-12%**	**20-26%**	**20-23%**	**20-22%**	**9-11%**	**8-10%**	**6-8%**

Courses in the Chemical Engineering Program according to Engineering Studies Sector Committee Requirements as follows

Topic	Topic Area							Total Contact hours	Total credit hours
	Humanities and Social Sciences	Business Management	Engineering Culture	Mathematics and Basic Sciences	Basic Engineering Sciences	Applied Engineering and design	Projects and Practice		
Humanities and Social Sciences								21	14
Business Management								7	5
Engineering Culture								12	8
Mathematics and Basic Sciences								52	37
Basic Engineering Sciences								72	48
Applied Engineering and design								73	51
Projects and Practice								13	7
Total Credit hours	14	5	8	37	48	51	7		170
Total Contact hours	21	7	12	52	72	73	13	250	
% Credit hours	8.24%	2.94 %	4.71%	21.76%	28.23%	30%	4.12%		100%
%Contact hours	8.4%	2.8%	4.8%	20.8%	28.8%	29.2%	5.2%	100%	
The Engineering Studies Sector Committee Requirements	8-12%	2- 4%	4-6%	18-22%	25-30%	25-30%	4-6%		

Topic	Topic Area				Total Contact hours	Total credit hours
	University Requirements	College Requirements	General Specialization Requirements	Specialization requirements		
University Requirements					24	16
College Requirements					75	49
General Specialization Requirements					86	59
Specialization requirements					65	46
Total Credit hours	16	49	59	46		170
Total Contact hours	24	75	86	65	250	
% Credit hours	9.41%	28.82%	34.71%	27.06%		100%
% Contact hours	9.6%	30%	34.4%	26%	100%	
Graduation Requirements	Min. 8%	Min. 20 %	Min. 35%	Max. 30%		

The above tables show the contact hours distribution and the requirements of

- The engineering sector and Supreme Council of Higher Education 2020
- The Egyptian NARS 2018, 2nd edition

The current program fulfils the NARS, The engineering sector requirements and Graduation requirements.

B. Courses, deletions, additions, and modifications

- The program adopts the National Academic Reference Standards (NARS 2018). It was approved by the department council in 12/7/2021. The program performs a plan to complete the reference standards see Appendix 2)

- Analysis of the program's competencies into knowledge outcomes and skills was approved by the Department Council, Meeting No. (4) on July 12, 2023, and by the Academic Council after review by the external evaluator.

C. Staff development requirements

- Frequent updating of the scientific information by investing in attending international conferences and workshops.
- A plan approved by the Academic Council for the development of faculty members and their assistants, through courses required for the development of the academic abilities and education of the faculty members and assistants without affecting the course schedule and providing physical support and time necessary to ensure access to these courses
- Training programs were conducted to develop the capabilities of faculty members and the supporting staff from the academic year 2015 until 2023/2024 with a completion rate of 78% for the faculty members and assistants, and a 75% completion rate for the management committee according to the training program. :

4. Progress of previous Action plan

Action	Person	Completion date	Progress
Preparation of the Accredited Program Curriculum for Chemical Engineering	Head of Department Faculty members	2023-2024	The curriculum has been completed and is pending approval from the ministry.
Analysis of Chemical Engineering Program Competencies into Knowledge Outcomes and Skills	Head of Department Faculty members	2023-2024	Completed.
External Review of the Program's Learning Outcomes	Head of Department Faculty members	2023-2024	Completed
Updating the Chemical Engineering Program Description (2019 Curriculum) According to Accreditation Body Requirements and Updated Learning Outcomes	Head of Department Faculty members	2023-2024	Completed
Increasing Student Enrollment in the Chemical Engineering Program and Implementing Internal Program Coordination	Head of Department Faculty members follow up management	2023-2024	Enrollment increased to 39 students from 14, a 2.8% increase.
Graduate Surveys - Awaiting results of graduate surveys.	Head of Department Faculty members	2023-2024	Not Completed
-Organic Chemistry Course (First-Year Student Surveys) -Review of the scientific content of the course in the curriculum with course description - Addressing the instructor to present lectures engagingly	Prof. Dr. Ghada Kadry	2023-2024	Satisfaction increased to 89%.
Construction Engineering Course (Student Satisfaction Surveys) - Decrease in student satisfaction with e-learning and lectures to 65%** - Review of the suitability of teaching 2023-2024and learning methods with the targeted learning outcomes for this course	Dr. Mohamed Salama	2023-2024	Instructor replaced; satisfaction increased to 93%.
Machine Design Course (Student Results) - Addressing the instructor to increase practical applications and theoretical lessons due to a drop in pass rates to 69% (an 11% decrease from the previous year	Prof. Dr. Mostafa El-Mohandes	2023-2024	Pass rates decreased to 36%, despite increased student satisfaction (90%), indicating a need for more practical applications and theoretical lessons
Physics Course with Practical Nature (Student Results) - Addressing the instructor to increase practical applications and theoretical lessons due to a drop in pass rates to 69% (an 11% decrease from the previous year)	Dr. Mostafa Shaaban	2023-2024	Pass rates decreased to 52%, despite increased student satisfaction (91%), indicating a need for more practical applications and theoretical lessons.
Follow-up on Improvement Plans According to Internal and External Reviews (Appendix 8)**	Head of Department Faculty members	2023-2024	Completed

Action	Person	Completion date	Progress
Description of Remaining Elective Courses to Provide Students with Options Aligned with Market Need	Head of Department Faculty members	2023-2024	Description of course CHE 381: Water Desalination completed
Follow-up on the Chemical Engineering Laboratory Development Plan (Appendix 8)	Head of Department Faculty members	2023-2024	Completed
Follow-up on Increasing Human Resources and Developing Faculty and Administrative Staff Capabilities	Institute Management	2023-2024	Not completed
Renewal of ASPEN HYSIS Program License	Dr. Haitham Abdel-Samad	2023-2024	Not completed
Follow-up on the Program's Research Plan (Appendix 8)**	Head of Department Faculty members follow up management	2023-2024	Completed
Follow-up on Improvement Plans According to Accreditation and Quality Assurance Visit (Appendix 8)	Head of Department Faculty members follow up management	2023-2024	Completed

الكتب التى تم شراءها وهى

كتب برنامج الهندسة الكيميائية التى تم شراؤها للعام الدراسي 2023 - 2024
من معرض القاهرة الدولى للكتاب بمركز مصر للمؤتمرات والمعارض الدولية بالتجمع الخامس

No	Book Name	Date	Author	Publisher	ISBN	Copy
1	Chemical Process Technology	2024	Mall I.D.	CBS	9789354661150	1
2	Engineering Chemistry	2024	Bhaskar Chaursia	CBS	9789354660160	1
3	Thermodynamics: An Engineering Approach ISE 10ed	2024	Yunus &Michael &	Mcgrow	9781266152115	1
4	Fuel and combustion	2023	Lewis Dotson	Brilliance Pub	9781915508980	1
5	Fundamentals Of Petroleum &Petrochemical Engineering	2023	Gabriel Walters	Brilliance Pub	978-1-80489-041-7	1
6	Handbook Of Natural Gas Engineering	2023	Jessie Blackwell	Brilliance Pub	978-1-80489-042-4	1
7	Chemical Engineering Thermodynamics Theory & Applications	2023	R.Ravi	Ane.Pvt.Ltd	978-93-89212-31-0	1
8	Synthetic Organic Chemistry	2023	Sushil Kumar	Wave	978-93-89801-27-9	1
9	Analytical Chemistry Skill Enhancement Course (PB)	2022	Chattopadhyay k	CBS	9789390709908	1
10	Analytical Chemistry : Basic Concepts	2022	Priti Malhotra	Ana Books Pvt	9789385462948	1
11	Applied Engineering Chemistry	2020	Ashok kumar	Aitbs Pub	9789374734957	1
12	استخدام الحاسوب في موازنات المادة والطاقة لطلاب الهندسة الكيميائية	2020	كامل محمد	دار الكتاب الحديث	9789953291048	1

مدير المكتبة
سماح محمود أحمد

5. Action Plan

Action	Person	Completion date
Implementation of the Accredited Chemical Engineering Program Regulations	Head of Department Faculty members	2024-2025
There has been a 46% drop in the results of first-year students compared to the previous year (2022/2023), where the pass rate was 86%. This requires: - Faculty members to consistently follow up with students through student advising. - Faculty members and their assistants to adhere to office hours as indicated in the class schedule. - Faculty members and their assistants must strictly follow the approved student assessment standards as outlined in the course description. - Faculty members should directly supervise laboratory sessions and practical work. -More time should be allocated to both theoretical and practical applications during lectures and class sessions.	Head of Department Faculty members	2024-2025
Add new topic: Design of secondary biological treatment units, to CHE481 - Environmental Engineering course 4th year	Dr. Heba Abdelgawad	2024-2025
Follow-up on Improvement Plans Based on Internal and External Reviews (Appendix 8)	Head of Department Faculty members	2024-2025
Completion of descriptions for remaining elective courses to provide students with appropriate options that meet labour market needs.	Head of Department Faculty members	2024-2025
Follow-up on the development plan for the chemical engineering laboratories (Appendix 8).	Head of Department Faculty members	2024-2025
Follow-up on the plan to increase human resources and enhance the capabilities of faculty members, their assistants, and administrative staff.	Institute Management	2024-2025
Renewal of the (ASPEN HYSYS) software license	Dr. Haitham Abdel-Samad	2024-2025
Follow-up on the program's research plan (Appendix 8).	Head of Department Faculty members follow up management	2024-2025
Monitoring the improvement plan following the Quality Assurance Authority's visit (Appendix 8).	Head of Department Faculty members follow up management	2024-2025

Program Coordinator Signature: Dr Ghada Kadry

In The Department Council 2-9-2024
In The Academic Council 18-9-2024