Ministry of Higher Education and Scientific Research
Scientific Supervision and Scientific Evaluation Apparatus
Directorate of Quality Assurance and Academic Accreditation
Accreditation Department

Academic Program and Course Description Guide

2024

Introduction:

The educational program is a well-planned set of courses that include procedures and experiences arranged in the form of an academic syllabus. Its main goal is to improve and build graduates' skills so they are ready for the job market. The program is reviewed and evaluated every year through internal or external audit procedures and programs like the External Examiner Program.

The academic program description is a short summary of the main features of the program and its courses. It shows what skills students are working to develop based on the program's goals. This description is very important because it is the main part of getting the program accredited, and it is written by the teaching staff together under the supervision of scientific committees in the scientific departments.

This guide, in its second version, includes a description of the academic program after updating the subjects and paragraphs of the previous guide in light of the updates and developments of the educational system in Iraq, which included the description of the academic program in its traditional form (annual, quarterly), as well as the adoption of the academic program description circulated according to the letter of the Department of Studies T 3/2906 on 3/5/2023 regarding the programs that adopt the Bologna Process as the basis for their work.

In this regard, we can only emphasize the importance of writing an academic programs and course description to ensure the proper functioning of the educational process.

Concepts and terminology:

Academic Program Description: The academic program description provides a brief summary of its vision, mission and objectives, including an accurate description of the targeted learning outcomes according to specific learning strategies.

Course Description: Provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the students to achieve, proving whether they have made the most of the available learning opportunities. It is derived from the program description.

Program Vision: An ambitious picture for the future of the academic program to be sophisticated, inspiring, stimulating, realistic and applicable.

Program Mission: Briefly outlines the objectives and activities necessary to achieve them and defines the program's development paths and directions.

Program Objectives: They are statements that describe what the academic program intends to achieve within a specific period of time and are measurable and observable.

Curriculum Structure: All courses / subjects included in the academic program according to the approved learning system (quarterly, annual, Bologna Process) whether it is a requirement (ministry, university, college and scientific department) with the number of credit hours.

Learning Outcomes: A compatible set of knowledge, skills and values acquired by students after the successful completion of the academic program and must determine the learning outcomes of each course in a way that achieves the objectives of the program.

Teaching and learning strategies: They are the strategies used by the faculty members to develop students' teaching and learning, and they are plans that are followed to reach the learning goals. They describe all classroom and extra-curricular activities to achieve the learning outcomes of the program.

Academic Program Description Form

University Name: University of Technology
Faculty/Institute: Chemical Engineering Department
Scientific Department: Chemical Engineering and Oil Pollution
Academic or Professional Program Name: Chemical Engineering and Oil Pollution
Final Certificate Name: BSC. in Chemical Engineering
Academic System: course
Description Preparation Date:
File Completion Date:

Signature:
Head of Department Name:
Asst. Prof. Dr. May Ali Alsaffar
Date: 3/4/2024

Signature:
Scientific Associate Name:
Talib M Albayati
Date: 3/4/2024

The file is checked by: Asst. Prof. Dr. Firas Khaleel AL-Zuhairi
Department of Quality Assurance and University Performance
Director of the Quality Assurance and University Performance Department:
Date: 3/4/2024
Signature:

3-4-2024
University of Technology
Chemical Engineering Department

Approval of the Dean
Prof. Dr. Khalid A. Sukkar

1. Program Vision

- Obtaining quality education and research in the field of environmental pollution resulting from industrial activities and oil.
- Encouraging the practical, applied and specialized side of the chemical engineering and oil pollution branch to stimulate their role in preserving the environment by creating engineering designs that serve the economy of our dear country.
- Transforming theoretical and scientific data in the field of pollutant treatment into practical reality through knowledge Principles and foundations of chemical engineering to give him the skill and scientific knowledge to open up to Various scientific and practical applications for example in the fields of oil and industry.

2. Program Mission

- Graduating engineering cadres with high potentials in applying the academic and applied aspects and specialized in the treatment of oil and industrial pollutants by preparing designs and integrated systems of Pioneering plans, programs and research projects, and activating partnership with oil institutions and industrial
- Having graduates who are able to contribute to the environmental chemical engineering profession in a context Modern industrial practice and sustainable development.
- Graduating specialized chemical engineers who are able to absorb advanced technology and deal with her in the preparation of special programs and designs for the treatment of oil and industrial pollutants for this sector of increasing importance in Iraq and to keep pace with the great expansion witnessed by the oil sector

3. Program Objectives

- Applying chemical engineering sciences and oil pollution in a manner that is ethically responsible and consistent with legal and social affairs.
- Having extensive knowledge and skillful thinking skills to critically analyze industrial problems and oil pollution, taking into account safety and social impact.
- Contributing to preparing engineering projects to treat the environment in oil refineries and factories Industrial and work on monitoring and evaluating various environmental problems and developing means of treatment and research in alternatives and modern engineering techniques. Spreading the culture of engineering environmental awareness in all aspects of the work of the chemical engineer and accreditation Sound standards that promote environment and renewable energy projects.
- Exchanging the expertise and scientific consultations, provision of laboratory services and encouragement of joint cooperation Through the exchange of experiences in the completion and implementation of research projects that serve the industrial sector and oil

4. Program Accreditation

N.A.

5. Other external influences

Is there a sponsor for the program?

N.A.

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution Requirements	43	6	4.6%	course / Basic
College Requirements	13	30	23%	
Department Requirements	40	94	72.3%	Core
Summer Training	2 months	N.A.	N.A.	
Other				

* This can include notes whether the course is basic or optional.

7. Program Description

Year/Level	Course Code	Course Name	Credit Hours	
			theoretical	practical
2023 -2024 Second Year 1nd Semester	CES.E.221	Mathematics III	3	0
	CES.E.231	Chemical Eng. Principles II	3	0
	CES.E.233	Fluid Flow I	3	2
	CES.E.235	Physical Chemistry I	2	2
	CES.E.223	Computer Programming I	2	2
	CES.E.237	Principles and Sustainability	3	0
	CES.E.238	Fuel's and Clean Eng.	2	2

Year/Level	Course Code	Course Name	Credit Hours	
			theoretical	practical
2023 -2024 Second Year 2nd Semester	CES.E.222	Mathematics IV	3	0
	CES.E.232	Chemical Eng. Principles III	3	0
	CES.E.234	Fluid Flow II	3	2
	CES.E.236	Physical Chemistry II	2	0
	CES.E.224	Computer Programming II	2	2
	CES.E.225	Materials Eng.	3	2
	CES.E.226	Statistics	3	0

Year/Level	Course Code	Course Name	Credit Hours	
			theoretical	practical
2023 -2024 Third Year 1nd Semester	CES.E.331	Thermodynamics I	3	0
	CES.E.321	Numerical Analysis	3	2
	CES.E.333	Mass Transfer	3	2
	CES.E.335	Chemical Reaction Kinetics	3	0
	CES.E.337	Heat Transfer I	3	0
	CES.E.339	Air Pollution Control Engineering	3	0
	CES.E.3310	Industrial Safety	2	0
	CES.E.3311	Equipment Design	3	0

Year/Level	Course Code	Course Name	Credit Hours	
			theoretical	practical
2023 -2024 Third Year 2nd Semester	CES.E.332	Thermodynamics II	3	2
	CES.E.322	Applied Mathematics in Environmental Engineering	3	0
	CES.E.334	Unit Operation I	4	0
	CES.E.336	Biochemical Reaction Eng.	3	0
	CES.E.338	Heat Transfer II	3	2
	CES.E.3312	Equipment Design in Environmental Engineering Using CAD	3	2
	CES.E.3313	Solid Waste Treatment	2	0

Year/Level	Course Code	Course Name	Credit Hours	
			theoretical	practical
2023 -2024 Fourth Year 1nd Semester	CES.E.421	Project I	1	2
	CES.E.431	Unit Operations II	3	2
	CES.E.433	Process Dynamics	3	0
	CES.E.435	Water and Wastewater Treatment Engineering I	3	0
	CES.E.423	Industrial & Petroleum Pollution Control	3	0
	CES.E.437	Catalysis and Catalytic Eng.	2	0
	CES.E.438	Environmental Engineering Management and Ethics	3	0

Year/Level	Course Code	Course Name	Credit Hours	
			theoretical	practical
2023 -2024 Fourth Year 2nd Semester	CES.E.422	Project II	1	2
	CES.P.432	Unit Operations I I I	3	0
	CES.E.434	Process Control and Instruments	3	2
	CES.E.436	Water and Wastewater Treatment Engineering II	2	2
	CES.E.424	Optimization	3	0
	CES.E.439	Corrosion and degradation	2	0

1. Expected learning outcomes of the program	
Knowledge	
A1	Mathematics, science and engineering underlying the practice of chemical engineering.
A2	The interactions involved in chemical engineering systems and analytical and computational tools to deal with these.
A3	The scope of chemical engineering from the molecular to the large scale.
A4	The economic, management and statutory requirements involved in the practice of chemical engineering.
Skills	
B1	Communicate clearly the findings of experiments, projects and other assignments using written reports, oral and visual presentations as well work effectively in a team, recognizing the roles played by different team members.
B2	Creatively employ applied science and engineering concepts in the design of industrial processes and equipment. Which in turn will demonstrate awareness of the importance of scaling techniques in design work.
B3	Perform complete mass and energy balances for chemical engineering plants. apply the principles of chemical equilibrium process thermodynamics to systems with chemical reactions.
B4	Chemical engineering graduates will be able to write coherent, concise, accurate technical reports ,use computers effectively for solving chemical engineering problems.
Ethics	
C1.	An ability to perceive ethical and professional responsibilities in engineering cases and make brilliant judgments taking into account the consequences in worldwide financial, ecological and societal considerations
C2	Apply the principles of the law as well as understanding of responsible research and innovation, data protection, ethics and bias relevant to AI research and innovation
C3	know how to support the development of 'sustainability thinking
C4	have developed an awareness of a chemical engineer's issues, obligations, and responsibilities with regard to ethics

2. Teaching and Learning Strategies

Written method
implies the following forms of activity: copying, taking notes, composing theses, writing essays, etc.
Laboratory method
implies the following forms of activity: conducting experiments, showing video materials, etc.
Practical methods
unite all the teaching forms that stimulate developing practical skills in students.
Explanatory method
is based on discuss
ing a given issue.
Designing and presenting a project.
Discussion/debates.
This is the most widely spread method of interactive teaching.
Case study
–
the teacher discusses concrete cases together with the students and they study the issue thoroughly
.

3. Evaluation methods

partial test (Oral questions :
- multiple choice ,alternative response), Open questions that have a definite answer , or do not have a definite answer, Quizzes, homework problems , Mid. term exams , Final exam.

4. Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements/Skills (if applicable)		Number of the teaching staff	
	General	Special			Staff	Lecturer
Professor Dr.Adnan A. AbdulRazak	Chemical engineering	Composite advanced material			Staff	
Professor Dr Khalid Hamid Rashid	Chemical engineering	Corrosion engineering			Staff	
Professor Dr. Zainab Yousif Shnain	Chemical engineering	Transmission phenomena and materials technology			Staff	
Professor Dr. Salman Hussein Abbas	Chemical engineering	Water Treatment			Staff	
Professor Dr Jenan Abdulkarem Al-Najar	Chemical engineering	Environmental treatment - materials technology			Staff	
Assistant Professor Dr. may Ali Muslim Alsaffar	Chemical engineering	Reactor Engineering – Advanced Materials Technology			Staff	
Assistant Professor Dr. Falak O. Abas	Chemical engineering	Chemical reaction engineering - environmental treatments			Staff	
Assistant Professor Dr. Alyaa Khadhier Mageed. Dr. Zahraa Fadhil Al-Auda	Chemical engineering	Auxiliary factors - reactor engineering			Staff	
Assistant Professor Dr. Farooq Ahmed Mehdi	Chemical engineering	Transmission phenomena - environmental treatments			Staff	
Assistant Professor Dr. Laith S. Sabri	Chemical engineering	Transmission phenomena			Staff	
Assistant Professor Dr. Manal Afham Toma	Chemistry Science	Polymer chemistry - membrane technology			Staff	
Assistant Professor Dr. Mahmood A.mohamed	political science	International politics			Staff	

Lecture Dr. Samira Njam Abdullah	Chemical engineering	Environment processors			Staff	
Lecture. Ayad Dari Jaafar	Chemical engineering	Nanotechnology - environmental treatments			Staff	
Lecture Alyaa Esam Mahdi	Chemistry Science	Organic chemistry - polymers			Staff	
Assistant Lecture Mohammed Shorbaz Graish	Chemical engineering	Materials technology			Staff	
Assistant Lecture Mohamed Abdul Rahman Abdul Ghany	Chemical engineering	Materials technology – separation processes			Staff	
Assistant Lecture Noor Edin Mousa	Chemical engineering	Chemical processes - environmental treatments			Staff	
Assistant Lecture Khitam Salim Shaker	Chemical engineering	Industrial units			Staff	
Assistant Lecture Zinah Abdulkareem Ghareeb	applied Sciences	Molecular biology in genetic engineering			Staff	
Assistant Lecture Safa Ameen Ahmed	Computer Science	Pattern recognition			Staff	

Professional Development

Mentoring new faculty members

- Their interaction with specialized professors who have experience in education
- Guiding them through seminars and educational courses

Professional development of faculty members

- Urging them to participate in international conferences by publishing research in reputable journals
- Urging them to partner with reputable international universities to learn about modern teaching techniques

5. Acceptance Criterion

Students are accepted through the central admission of the Ministry of Higher Education

6. The most important sources of information about the program

- M.G.FONTANA and N.D.GREENE,CORROSION ENGINEERING ,3rd Edition, Mc-GRAW-HILL BOOK COMPANY 1985
- Colulsson ,J.M and Richardson J.F. "Chemical Engineering , volume 1",
- Binay.K.Dutta "mass transfer and separation process "2007.
- Trebal Robert E.,"mass transfer operation"2ed edition, Mc-Graw –Hill Book com.1975.

7. Program Development Plan

- Updating laboratories and adding new experiments
- Opening the air treatment laboratory

Program Skills Outline															
				Required program Learning outcomes											
Year/Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
Second Year 1st semester	CES.E.221	Mathematics III	C		√				√			√	√	√	√
	CES.E.231	Chemical Eng. Principles II		√	√	√		√	√	√	√	√	√	√	√
	CES.E.233	Fluid Flow I		√	√	√		√	√	√		√	√	√	√
	CES.E.235	Physical Chemistry I		√		√			√			√	√	√	√
	CES.E.223	Computer Programming I		√	√			√	√	√		√	√	√	√
	CES.E.237	Principles and Sustainability		√		√		√				√	√	√	√
	CES.E.238	Fuel's and Clean Eng.							√			√	√	√	√

Program Skills Outline															
				Required program Learning outcomes											
Year/Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
Second Year **2st semester**	CES.E.222	Mathematics IV	C		√				√	√	√	√	√	√	√
	CES.E.232	Chemical Eng. Principles III		√		√	√	√			√	√	√	√	√
	CES.E.234	Fluid Flow II		√	√	√		√	√	√	√	√	√	√	√
	CES.E.236	Physical Chemistry II		√		√		√			√	√	√	√	√
	CES.E.224	Computer Programming II		√	√			√	√	√	√	√	√	√	√
	CES.E.225	Materials Eng.		√		√	√	√			√	√	√	√	√
	CES.E.226	Statistics		√	√			√	√	√	√	√	√	√	√

Program Skills Outline															
				Required program Learning outcomes											
Year/Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
Third Year 1st semester	CES.E.331	Thermodynamics I	C	√		√	√	√	√	√	√	√	√	√	√
	CES.E.321	Numerical Analysis			√			√	√	√	√	√	√	√	√
	CES.E.333	Mass Transfer		√	√	√		√	√	√	√	√	√	√	√
	CES.E.335	Chemical Reaction Kinetics		√	√	√		√	√	√	√	√	√	√	√
	CES.E.337	Heat Transfer I		√	√	√		√	√	√	√	√	√	√	√
	CES.E.339	Air Pollution Control Engineering		√	√	√		√	√	√	√	√	√	√	√
	CES.E.3310	Industrial Safety		√		√	√	√	√		√	√	√	√	√
	CES.E.3311	Equipment Design		√		√	√	√	√	√	√	√	√	√	√

Program Skills Outline															
				Required program Learning outcomes											
Year/Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
Third Year 2 st semester	CES.E.332	Thermodynamics II	C	√		√	√	√	√	√	√	√	√	√	√
	CES.E.322	Applied Mathematics in Environmental Engineering			√			√	√	√	√	√	√	√	√
	CES.E.334	Unit Operation I		√	√	√		√	√	√	√	√	√	√	√
	CES.E.336	Biochemical Reaction Eng.		√	√	√		√	√	√	√	√	√	√	√
	CES.E.338	Heat Transfer II		√	√	√		√	√	√	√	√	√	√	√
	CES.E.3312	Equipment Design in Environmental Engineering Using CAD		√	√	√		√	√	√	√	√	√	√	√
	CES.E.3313	Solid Waste Treatment		√	√	√	√	√	√	√	√	√	√	√	√

Program Skills Outline															
				Required program Learning outcomes											
Year/Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
Fourth Year 1st semester	CES.E.421	Project I	C	√		√	√	√	√	√	√	√	√	√	√
	CES.E.431	Unit Operations II		√	√	√		√	√	√	√	√	√	√	√
	CES.E.433	Process Dynamics		√	√	√	√	√	√	√	√	√	√	√	√
	CES.E.435	Water and Wastewater Treatment Engineering I		√	√	√	√	√	√	√	√	√	√	√	√
	CES.E.423	Industrial & Petroleum Pollution Control		√	√	√	√	√	√	√	√	√	√	√	√
	CES.E.437	Catalysis and Catalytic Eng.		√		√		√	√		√	√	√	√	√
	CES.E.438	Environmental Engineering Management and Ethics		√	√		√	√	√	√	√	√	√	√	√

Program Skills Outline															
				Required program Learning outcomes											
Year/Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics			
				A1	A2	A3	A4	B1	B2	B3	B4	√	√	√	√
Fourth Year 2st semester	CES.E.422	Project II	C	√		√	√	√	√	√	√	√	√	√	√
	CES.P.432	Unit Operations I I I		√	√	√		√	√	√	√	√	√	√	√
	CES.E.434	Process Control and Instruments		√	√	√	√	√	√	√	√	√	√	√	√
	CES.E.436	Water and Wastewater Treatment Engineering II		√	√	√	√	√	√	√	√	√	√	√	√
	CES.E.424	Optimization		√	√	√	√	√	√	√	√	√	√	√	√
	CES.E.439	Corrosion and degradation		√		√		√	√		√	√	√	√	√

- **Please tick the boxes corresponding to the individual program learning outcomes under evaluat**