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 Processing Engineering.....

Academic or Professional Program Name: ..... Chemical Processing Engineering.....

Final Certificate Name: ..B.Sc.....

Academic System: ...Courses.....

Description Preparation Date

File Completion Date: 2/4/2024

Signature:

Head of Department Name:

Prof.Dr. Asawer A. Alwasiti

Date: 2/4/2024

Signature: Talib

Scientific Associate Name:

Talib M Albayati

Date: 3/4/2024

The file is checked by: Ass. Prof. Dr. Firas K. 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

Approval of the Dean

Prof. Dr. Khalid A. Sukkar

University of Technology
Chemical Engineering Department

1. Program Vision

- Being a part of international education in promoting leadership and innovation in education, research, and societal service

2. Program Mission

- Providing academic programs in physical and chemical processes, as well as engineering design to prepare chemical engineers able to work in different industrial sectors.

3. Program Objectives

1. Prepare chemical engineers who can integrate engineering theories with chemical engineering processes to design and analyze process problems considering environmental impacts and safety.
2. Giving the gradualists the required scientific and technical skills to work successfully in chemical engineering processing sectors
3. Preparing engineers who can work in an effective work team in terms of exchanging opinions and successful leadership while preserving the ethics of the profession
4. Maintain lifelong learning for professional development in both academic and industrial processing sectors

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	**5**	**6**	**4.6%**	**Basic**
College Requirements	**13**	**30**	**23%**	**Basic**
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 1st Semester	CES.P.221	Mathematics III	2	0
	CES.P.231	Chemical Eng. Principles II	2	0
	CES.P.233	Fluid Flow I	2	2
	CES.P.235	Physical Chemistry I	2	2
	CES.P.223	Computer Programming I	1	2
	CES.P.225	Materials Eng. I	2	0
	CES.P.237	Fuel's & Energy Eng.	2	2

Year/Level	Course Code	Course Name	Credit Hours	
			theoretical	**practical**
2023 -2024 Second Year 2nd Semester	CES.P.222	Mathematics IV	2	0
	CES.P.232	Chemical Eng. Principles III	2	0
	CES.P.234	Fluid Flow II	2	2
	CES.P.236	Physical Chemistry II	2	0
	CES.P.224	Computer Programming II	1	2
	CES.P.226	Materials Eng. II	2	2
	CES.P.227	Statistics	2	0

Year/Level	Course Code	Course Name	Credit Hours	
			theoretical	**practical**
2023 -2024 Third Year	CES.P.331	Thermodynamics I	2	0
	CES.P.321	Numerical Analysis	2	2
	CES.P.333	Mass Transfer	2	2

1nd Semester	CES.P.335	Chemical Reaction Kinetics	2	0
	CES.P.337	Heat Transfer I	2	0
	CES.P.339	Environment Eng. & Industrial Safety	2	0
	CES.P.3310	Bio Chemical Engineering	2	0
	CES.P.3311	Equipment Design	2	0

Year/Level	Course Code	Course Name	Credit Hours	
			theoretical	practical
2023 -2024 Third Year 2nd Semester	CES.P.332	Thermodynamics II	2	**2**
	CES.P.322	Applied Mathematics in Chemical Engineering	2	0
	CES.P.334	Unit Operation I	3	0
	CES.P.336	Reactor Design	2	0
	CES.P.338	Heat Transfer II	2	2
	CES.P.3312	Equipment Design Using CAD	2	2
	CES.P.3313	Particles& Nanotechnology	2	0

Year/Level	Course Code	Course Name	Credit Hours	
			theoretical	practical
2023 -2024 Fourth Year 1nd Semester	CES.P.421	Project I	1	2
	CES.P.431	Unit Operations II	2	2
	CES.P.433	Process Dynamics	2	0
	CES.P.435	Petroleum Refinery Processing	2	0
	CES.P.436	Heterogeneous Reactor &Catalyst	2	0
	CES.P.423	Industrial Management &Ethics	2	0
	CES.P.437	Chemical Process Industries I	2	3

Year/Level	Course Code	Course Name	Credit Hours

			theoretical	practical
2023 -2024 Fourth Year 2nd Semester	CES.P.422	Project II	1	2
	CES.P.432	Unit Operations III	3	0
	CES.P.434	Process Control	2	2
	CES.P.438	Chemical Process Industries II	2	0
	CES.P.424	Optimization	2	0
	CES.P.439	Corrosion Eng.	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
Dr. Thamer J. Mohammed	Chemical engineering	Transport phenomena			Staff	
Dr. Qusay Fadhel Abd Alhameed	Chemical engineering	Membrane technology, Mass transfer			Staff	
Dr. Jamal Manea Ali Al-Rubaye	Chemical engineering	Transport phenomena			Staff	
Dr. Amer A. Abdul Rahman	Chemical engineering	Transport phenomena			Staff	
Dr. Riyadh Sadeq Mohammed Salih	Chemical engineering	Transport phenomena			Staff	
Dr. Bashir Yousif Sherhan Al-Zaidi	Chemical engineering	Catalysis, Reactor engineering			Staff	
Dr. Farah Talib Jasim	Chemical engineering	Transport phenomena, Reactor engineering			Staff	

Dr. Shurooq Talib Remedhan	Chemical engineering	Thermodynamic, Transport phenomena			Staff	
Dr. Saad Raheem Sulttan	Chemical engineering	Polymer technology			Staff	
Dr. Ali Abdul Rahman Nsaf Jassem	Chemistry Science	Transport phenomena, Chemical reactor design			Staff	
Dr. Abbas Jawad Sultan	Chemistry Science	Transport phenomena			Staff	
Dr. Haiyam Mohammed Abdul Raheem	Chemical engineering	Nanomaterials, Environmental treatments			Staff	
Gaidaa Saeed Mahdi	Computer Sciences	Data security			Staff	
Fadhel Hashim Faraj	Chemistry Science	Separation operations			Staff	
Dr. Areej Dalaf Abbas Barood	Chemical engineering	Chemical reactor engineering			Staff	
Dr. Afraa Hilal Kamel	Chemical engineering	Heat transfer			Staff	
Bashar Jawad kadhim	Chemical engineering	Polymer technology			Staff	
Ali Mohammed Hameed	Chemical engineering	Separation operations			Staff	
Maryam Yousif Gadhban	Chemical engineering	Transport phenomena			Staff	
Dr. Omar Sabaah Mahdy	Chemical engineering	Membrane technology, Separation operations			Staff	
Dr. Haydar Alaa Salih	Chemical engineering	Biochemical engineering, Transport phenomena			Staff	
Nesma Balsim Ahmed	Chemical engineering	Transport phenomena			Staff	
Ali Amer Yahya	Chemical engineering	Transport phenomena			Staff	
Noor Salah Abood	Chemical engineering	Environmental treatments			Staff	
Maryam Tarq Hassen	Chemical engineering	Biochemical engineering			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.P.221	Mathematics III	C		√				√			√	√	√	√
	CES.P.231	Chemical Eng. Principles II		√	√	√		√	√	√	√	√	√	√	√
	CES.P.233	Fluid Flow I		√	√	√		√	√	√		√	√	√	√
	CES.P.235	Physical Chemistry I		√		√			√			√	√	√	√
	CES.P.223	Computer Programming I		√	√			√	√	√		√	√	√	√
	CES.P.225	Principles and Sustainability		√		√		√				√	√	√	√
	CES.P.237	Fuels 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.P.222	Mathematics IV	C		√				√	√	√	√	√	√	√
	CES.P.232	Chemical Eng. Principles III		√		√	√	√			√	√	√	√	√
	CES.P.234	Fluid Flow II		√	√	√		√	√	√	√	√	√	√	√
	CES.P.236	Physical Chemistry II		√		√		√			√	√	√	√	√
	CES.P.224	Computer Programming II		√	√			√	√	√	√	√	√	√	√
	CES.P.226	Materials Eng.		√		√	√	√			√	√	√	√	√
	CES.P.227	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.P.331	Thermodynamics I	C	√		√	√	√	√	√	√	√	√	√	√
	CES.P.321	Numerical Analysis			√			√	√	√	√	√	√	√	√
	CES.P.333	Mass Transfer		√	√	√		√	√	√	√	√	√	√	√
	CES.P.335	Chemical Reaction Kinetics		√	√	√		√	√	√	√	√	√	√	√
	CES.P.337	Heat Transfer I		√	√	√		√	√	√	√	√	√	√	√
	CES.P.339	Environment Eng. & Industrial Safety		√	√	√		√	√	√	√	√	√	√	√
	CES.P.3310	Bio Chemical Engineering		√		√	√	√	√		√	√	√	√	√
	CES.P.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.P.332	Thermodynamics II	C	√		√	√	√	√	√	√	√	√	√	√
	CES.P.322	Applied Mathematics in Chemical Engineering			√			√	√	√	√	√	√	√	√
	CES.P.334	Unit Operation I		√	√	√		√	√	√	√	√	√	√	√
	CES.P.336	Reactor Design		√	√	√		√	√	√	√	√	√	√	√
	CES.P.338	Heat Transfer II		√	√	√		√	√	√	√	√	√	√	√
	CES.P.3313	Particles& Nanotechnology		√	√	√		√	√	√	√	√	√	√	√
	CES.P.3312	Equipment Design Using CAD		√	√	√	√	√	√	√	√	√	√	√	√

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.P.421	Project I	C	√		√	√	√	√	√	√	√	√	√	√
	CES.P.431	Unit Operations II		√	√	√		√	√	√	√	√	√	√	√
	CES.P.433	Process Dynamics		√	√	√	√	√	√	√	√	√	√	√	√
	CES.P.435	Petroleum Refinery Processing		√	√	√	√	√	√	√	√	√	√	√	√
	CES.P.436	Heterogeneous Reactor &Catalyst		√	√	√	√	√	√	√	√	√	√	√	√
	CES.P.423	Industrial Management &Ethics		√		√		√	√		√	√	√	√	√
	CES.P.437	Chemical Process Industries I		√	√		√	√	√	√	√	√	√	√	√

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.P.422	Project II	C	√		√	√	√	√	√	√	√	√	√	√
	CES.P.432	Unit Operations III		√	√	√		√	√	√	√	√	√	√	√
	CES.P.434	Process Control		√	√	√	√	√	√	√	√	√	√	√	√
	CES.P.438	Chemical Process Industries II		√	√	√	√	√	√	√	√	√	√	√	√
	CES.P.424	Optimization		√	√	√	√	√	√	√	√	√	√	√	√
	CES.P.439	Corrosion Eng.		√		√		√	√		√	√	√	√	√
	CES.P.4310	Petrochemical Industries													

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