Republic of Iraq
Ministry of Higher Education & Scientific Research
Supervision and Scientific Evaluation Directorate
Quality Assurance and Academic Accreditation
International Accreditation Dept.

Academic Program Specification Form For The Academic Year 2022-2023

University: Technology
College: Chemical Engineering Department / Chemical Engineering and Oil Pollution
Number of Departments in the College: 3
Date of Form Completion: update 2023

Prof. Dr. Jamal M. Ali

Dean's Name
Date: 12 / 1 / 2023
Signature

Assist. Prof. Dr. May A. Muslim

Dean's Assistant For Scientific Affairs
Date: / / 2023
Signature

Assist. Prof. Dr. Firas K. Al-Zuhairi

The College Quality Assurance and University Performance Manager
Date: 12 / 1 / 2023
Signature

Quality Assurance and University Performance Manager

Date: / / 2023
Signature

TEMPLATE FOR PROGRAMME SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

PROGRAMME SPECIFICATION

This Program Specification provides a concise summary of the main features of the program and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It is supported by a specification for each course that contributes to the program.

1. Teaching Institution	University of Technology
2. University Department/Centre	Chemical Engineering Department/
3. Programme Title	Chemical and Environmental Pollution Engineering Branch
4. Title of Final Award	B.Sc. in chemical engineering
5. Modes of Attendance offered	4 years full time
6. Accreditation	None
7. Other external influences	
8. Date of production/revision of this specification	October 2022
9. Aims of the Program	
*Produce graduate Chemical Engineers satisfying the academic requirements at Chem. Eng. level for Corporate Membership of the Institution of Environmental Chemical Engineers.	
*Develop students' intellectual and reasoning powers, their ability to perceive the broader perspective, and their problem-solving skills through the integration of a broad range of subject material	
*Produce graduates capable of contributing to the profession of Environmental chemical engineering in the	
*Teach students to communicate clearly, to argue rationally and to draw conclusions based on a rigorous, analytical and critical approach to data and systems.	

10. Learning Outcomes, Teaching, Learning and Assessment Methods

A. Knowledge and Understanding

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.

B. Subject-specific skills

B. Subject-specific skills

B1: Use mathematics, science and engineering to support theoretical and practical analysis of process operations.

B2: Employ concepts from the applied and engineering sciences creatively to design industrial processes and equipment.

B3: Show awareness of the significance of scale-up techniques in design work.

Teaching and Learning Methods

Lectures, Tutorials, Example Classes, Practical Applications, reports, Weekly homework problems.

Assessment methods

Most of the curriculum supports B1: classroom time includes tutorial sessions, where students attempt problems. In private study, students develop skills by writing laboratory reports, and tackling problems set by the tutor or in past examinations. B2 and B3 are of increasing importance as students' progress from level 1 up to 3.

C. Thinking Skills

C1. Perform complete mass and energy balances for chemical engineering plants.
C2. Apply the principles of chemical equilibrium and process thermodynamics to systems with chemical reactions.
C3. Chemical engineering graduates will be able to write coherent, concise, and accurate technical reports.
C4. Chemical engineering graduates will be able to use computers effectively for solving chemical engineering problems.

Teaching and Learning Methods

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 discussing 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.

Assessment 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.

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1: Manipulate, sort and present data in forms useful for understanding. Select, interpret and validate data, identifying possible errors and inconsistencies

D2: Communicate clearly the findings of experiments, projects and other assignments using written reports, oral and visual presentations.

D3: Work effectively in a team, recognizing the roles played by different team members.

Teaching and Learning Methods
Lectures, Tutorials, Example Classes, Practical Applications, reports, Weekly homework problems.

Assessment 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.

First Year

Chemical Engineering and Oil Pollution

No.	First Semester					
	Code Course	Subject	L	P	T	Credits
1	CES.E.111	Technical English I	2	0	0	2
2	CES.E.121	Mathematics I	2	0	1	2
3	CES.E.123	Chemistry	2	2	0	3
4	CES.E.125	Physics for Environmental Engineering	2	0	1	2
5	CES.E.126	Engineering Drawing	1	2	0	2
6	CES.E.113	Computer Science	1	2	0	2
7	CES.E.114	Workshop I	0	6	0	-
		Total	10	12	2	**13**
		Hours/week	**24**			

No.	Second Semester					
	Code Course	Subject	L	P	T	Credits
1	CES.E.112	Technical English II	2	0	0	2
2	CES.E.122	Mathematics II	2	0	1	2
3	CES.E.131	Chemical Engineering Principles I	3	0	1	3
4	CES.E.124	Bio-Chemistry	2	2	0	3
5	CES.E.127	AutoCAD	1	2	0	2
6	CES.E.128	Engineering Mechanics & Strength of Materials	2	0	1	2
7	CES.E.115	Workshop II	0	6	0	-
8	CES.E.116	Human Rights & Democracy	2	0	0	2
		Total	14	10	3	16
		Hours/week	**27**			

Second Year

Chemical Engineering and Oil Pollution

No.	First Semester					
	Code Course	Subject	L	P	T	Credits
1	CES.E.221	Mathematics III	2	0	1	2
2	CES.E.231	Chemical Eng. Principles II	2	0	1	2
3	CES.E.233	Fluid Flow I	2	2	1	3
4	CES.E.235	Physical Chemistry I	2	2	0	3
5	CES.E.223	Computer Programming I	1	2	1	2
6	CES.E.225	Principles and Sustainability	2	0	1	2
7	CES.E.237	Fuel's & Clean Eng.	2	2	0	3
		Total	13	8	5	17
		Hours/week	26			

Second Semester						
No.	Code Course	Subject	L	P	T	Credits
1	CES.E.222	Mathematics IV	2	0	1	2
2	CES.E.232	Chemical Eng. Principles III	2	0	1	2
3	CES.E.234	Fluid Flow II	2	2	1	3
4	CES.E.236	Physical Chemistry II	2	0	0	2
5	CES.E.224	Computer Programming II	1	2	1	2
6	CES.E.226	Materials Eng. I	2	2	1	3
7	CES.E.227	Statistics	2	0	1	2
		Total	13	6	6	16
		Hours/week	**25**			

Third Year

Chemical Engineering and Oil Pollution

No.	First Semester					
	Code Course	Subject	L	P	T	Credits
1	CES.E.331	Thermodynamics I	2	0	1	2
2	CES.E.321	Numerical Analysis	2	2	1	3
3	CES.E.333	Mass Transfer	2	2	1	3
4	CES.E.335	Chemical Reaction Kinetics	2	0	1	2
5	CES.E.337	Heat Transfer I	2	0	1	2
6	CES.E.339	Air Pollution Control Engineering	2	0	1	2
7	CES.E.3311	Industrial Safety	2	0	0	2
8	CES.E.3313	Equipment Design	2	0	1	2
		Total	16	4	7	18
		Hours/week	27			

No.	Second Semester					
	Code Course	Subject	L	P	T	Credits
1	CES.E.332	Thermodynamics II	2	2	1	3
2	CES.E.322	Applied Mathematics in Chemical Engineering	2	0	1	2
3	CES.E.334	Unit Operation I	3	0	1	3
4	CES.E.336	Biochemical Reaction Eng.	2	0	1	2
5	CES.E.338	Heat Transfer II	2	2	1	3
6	CES.E.3312	Equipment Design in Environmental Engineering Using CAD	2	2	1	3
7	CES.E.3313	Solid Waste Treatment	2	0	0	3
		Total	15	6	6	18
		Hours/week	**27**			

Fourth Year

Chemical Engineering and Oil Pollution

No.	First Semester					
	Code Course	Subject	L	P	T	Credits
1	CES.E.421	Project I	1	2	0	2
2	CES.E.431	Unit Operations II	2	2	1	3
3	CES.E.433	Process Dynamics	2	0	1	2
4	CES.E.435	Water and Wastewater Treatment Engineering I	2	2	1	3
5	CES.E.423	Industrial & Petroleum Pollution Control	2	0	1	2
6	CES.E.437	Catalysis and Catalytic Eng.	2	0	1	2
7	CES.E.438	Environmental Engineering Management and Ethics	2	0	1	2
		Total	13	6	6	16
		Hours/week	25			

No.	Second Semester					
	Code Course	Subject	L	P	T	Credits
1	CES.E.422	Project II	1	2	0	2
2	CES.P.432	Unit Operations III	2	0	1	2
3	CES.E.434	Process Control	2	2	1	3
4	CES.E.436	Water and Wastewater Treatment Engineering II	2	0	0	2
5	CES.E.424	Optimization	2	0	1	2
6	CES.E.439	Petroleum Refinery Processing	2	0	1	2
7	CES.E.4310	Corrosion and degradation	2	0	0	2
		Total	14	4	4	16
		Hours/week	22			

13. Personal Development Planning

- Formative assessments
- Independent research projects
- Group projects
- Assessed seminar presentations
- Reflective commentaries / logs
- Portfolio-based assessment

14. Admission criteria .

1- The applicant must have completed a minimum of 12 years of education in school and passed all the subjects in the Higher Secondary examination.

2- All applicants must complete 17 years of age on or before the 31st of December in the year of admission.

3- Admission to higher education in Iraq is granted to students with a Secondary School Certificate, No entrance examination is required for admission to higher education, yet admission to engineering does require high scores in the Secondary School Certificate examination, these scores are determined annually by the Ministry of Higher Education and Scientific Research.

15. Key sources of information about the programme

Curriculum Skills Map
please tick in the relevant boxes where individual Program Learning Outcomes are being assessed

Program Learning Outcomes

Year / Level	Course Code	Course Title	Core (C) Title or Option (O)	Knowledge and understanding				Subject-specific skills				Thinking Skills				General and Transferable Skills (or) Other skills relevant to employability and personal development				
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	D1	D2	D3	D4	D5
First Year	CES.E.114	Workshops I	C	√	√		√	√	√	√	√			√	√	√	√			
	CES.E.111	Technical English I		√					√		√			√		√		√		
	CES.E.116	Human Rights & Democracy				√		√		√	√								√	√
	CES.E.113	Computer Science		√												√				
	CES.E.121	Mathematics I			√				√											
	CES.E.125	Physics for Environmental Engineering		√			√		√	√	√	√			√	√				
	CES.E.123	Chemistry I		√		√	√					√		√		√				
	CES.E.126	Eng. Drawing		√			√									√				

Curriculum Skills Map
please tick in the relevant boxes where individual Program Learning Outcomes are being assessed

Program Learning Outcomes

Year / Level	Course Code	Course Title	Core (C) Title or Option (O)	Knowledge and understanding				Subject-specific skills				Thinking Skills				General and Transferable Skills (or) Other skills relevant to employability and personal development				
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	D1	D2	D3	D4	D5
First Year		Elective	C	√								√								
	CES.E.115	Workshops II		√					√		√			√	√	√	√			
	CES.E.112	Technical English II		√					√		√			√		√		√		
	CES.E.122	Mathematics II			√				√											
	CES.E.128	Engineering Mechanics & Strength of Materials		√			√		√	√	√	√			√	√				
	CES.E.127	AutoCAD II		√			√													
	CES.E.124	Bio-Chemistry		√				√				√				√				

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Program Learning Outcomes

Year / Level	Course Code	Course Title	Core (C) Title or Option (O)	Knowledge and Understanding				Subject-specific skills				Thinking Skills				General and Transferable Skills (or) Other skills relevant to employability and personal development				
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	D1	D2	D3	D4	D5
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	Fuels and Clean eng.							√									√	√	

Curriculum Skills Map
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Program Learning Outcomes

Year / Level	Course Code	Course Title	Core (C) Title or Option (O)	Knowledge and Understanding				Subject-specific skills				Thinking Skills				General and Transferable Skills (or) Other skills relevant to employability and personal development				
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	D1	D2	D3	D4	D5
Second Year 2nd 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.212	Computer Programming II		√	√			√	√	√	√	√		√	√	√	√			√
	CES.E.225	Materials Eng.		√		√	√					√				√				
	CES.E.226	Statistics		√	√				√	√	√	√		√	√	√				√

Curriculum Skills Map
please tick in the relevant boxes where individual Program Learning Outcomes are being assessed

Program Learning Outcomes

Year / Level	Course Code	Course Title	Core (C) Title or Opt	Knowledge and understanding				Subject-specific skills				Thinking Skills				General and Transferable Skills (or) Other skills relevant to employability and personal development				
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	D1	D2	D3	D4	D5
Third Year 1st semes-ter	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.3311	Industrial Safety		√		√	√		√				√	√		√				
	CES.E.3313	Equipment Design		√		√	√	√	√	√	√	√	√	√	√	√	√	√	√	√

Curriculum Skills Map
please tick in the relevant boxes where individual Programme Learning Outcomes are being assessed

Programme Learning Outcomes

Year / Leve	Course Code	Course Title	Core (C) Title or Opt	Knowledge and understanding				Subject-specific skills				Thinking Skills				General and Transferable Skills (or) Other skills relevant to employability and personal development				
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	D1	D2	D3	D4	D5
Third Year 2nd Semester	CES.E.332	Thermodynamics II	C	√		√	√	√	√	√		√	√	√		√				
	CES.E.322	Applied Mathematics in Chemical Engineering			√			√	√	√	√	√	√	√	√	√				
	CES.E.334	Unit Operation I		√	√	√		√	√	√		√	√	√		√				
	CES.E.336	Biochemical Reaction Eng.		√	√	√		√	√	√		√	√	√		√				
	CES.E.338	Heat Transfer II		√	√	√		√	√	√		√	√	√		√				
	CES.E.3313	Solid Waste Treatment		√	√	√		√	√	√		√		√		√				
	CES.E.3312	Equipment Design in Environmental Engineering Using CAD		√	√	√	√	√	√	√		√	√			√				
				√		√	√	√	√	√	√	√	√	√	√	√	√	√	√	√

Curriculum Skills Map
please tick in the relevant boxes where individual Programme Learning Outcomes are being assessed

Programme Learning Outcomes

Year / Lev	Course Code	Course Title	Core (C) Title or Option (O)	Knowledge and Understanding				Subject-specific skills				Thinking Skills				General and Transferable Skills (or) Other skills relevant to employability and personal development				
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	D1	D2	D3	D4	D5
Fourth Year 1st semes-ter	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.437	Industrial & Petroleum Pollution Control		√	√	√	√	√	√	√		√	√			√				
	CES.E.438	Catalysis and Catalytic Eng.		√		√			√	√		√	√			√				
	CES.E.423	Environmental Engineering Management and Ethics		√	√		√		√		√	√		√	√	√	√	√	√	√

Curriculum Skills Map

please tick in the relevant boxes where individual Programme Learning Outcomes are being assessed

				Programme Learning Outcomes																
Year / Level	**Course Code**	**Course Title**	**Core (C) Title or Option (O)**	**Knowledge and Understanding**				**Subject-specific skills**				**Thinking Skills**				**General and Transferable Skills (or) Other skills relevant to employability**				
				A1	**A2**	**A3**	**A4**	**B1**	**B2**	**B3**	**B4**	**C1**	**C2**	**C3**	**C4**	**D1**	**D2**	**D3**	**D4**	**D5**
Fourth Year 2nd semes-ter	CES.E.422	Project II	C	√		√	√	√	√	√	√	√	√	√	√		√	√	√	√
	CES.E.432	Unit Operations III		√	√	√		√	√	√		√	√	√		√				
	CES.E.434	Process Control		√	√	√	√	√	√	√		√		√	√	√				
	CES.E.436	Water and Wastewater Treatment Engineering II		√	√	√	√	√	√	√		√	√			√				
	CES.E.424	Optimization		√	√	√	√	√	√	√		√	√			√				
	CES.E.439	Corrosion and degradation		√		√			√	√		√	√			√				
	CES.E.422	Project II		√	√		√		√		√	√		√	√	√	√	√	√	√