

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 2015-2016

University: Technology

College : Department of Chemical Engineering / Industrial Pollution Engineering  
Programming

Number Of Departments In The College : -

Date Of Form Completion :

Prof. Dr. Thamir Jasim Mohammad

Prof. Dr. Mohammad F. Abid

Dr. Farah Talib Jasim AL-Sudani

Dean's Name:

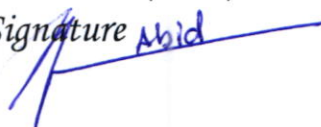
Dean's Assistant For  
Scientific Affairs

The College Quality Assurance  
And University Performance  
Manager

Date :     /     / 2016

Signature 

Date :     /     / 2016

Signature 

Date :     /     / 2016

Signature 

Quality Assurance And University Performance Manager

Date :     /     / 2016

Signature

## TEMPLATE FOR PROGRAMME SPECIFICATION

### HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

#### PROGRAMME SPECIFICATION

This Programme Specification provides a concise summary of the main features of the programme 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 programme.

1. Teaching Institution	University of Technology
2. University Department/Centre	Department of Chemical Engineering
3. Program Title	Industrial Pollution Engineering Program
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	September 2015
9. Aims of the Program	
<ul style="list-style-type: none"><li>• Produce graduate Chemical Engineers satisfying the academic requirements at CEng level for Corporate Membership of the Institution of Environmental Chemical Engineers.</li><li>• 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</li><li>• Produce graduates capable of contributing to the profession of Environmental chemical engineering in the context of modern industrial practice and sustainable development.</li></ul>	
<ul style="list-style-type: none"><li>• Teach students to communicate clearly, to argue rationally and to draw conclusions based on a rigorous, analytical and critical approach to data and systems.</li></ul>	



10. Learning Outcomes, Teaching, Learning and Assessment Methods
<p>A. Knowledge and Understanding</p> <p>A1: Mathematics, science and engineering underlying the practice of chemical engineering.</p> <p>A2: The interactions involved in chemical engineering systems and analytical and computational tools to deal with these.</p> <p>A3: The scope of chemical engineering from the molecular to the large scale.</p> <p>A4: The economic, management and statutory requirements involved in the practice of chemical engineering.</p>
<p>B. Subject-specific skills</p> <p>B1: Use mathematics, science and engineering to support theoretical and practical analysis of process operations.</p> <p>B2: Employ concepts from the applied and engineering sciences creatively to design industrial processes and equipment.</p> <p>B3: Show awareness of the significance of scale-up techniques in design work.</p>
Teaching and Learning 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.
Assessment methods
Written examinations are the main means of assessment for B1, although preparation of laboratory and project reports also contribute. For B2 and B3, project assignments set students increasingly open-ended problems to which they are expected to apply basic concepts.
<p>C. Thinking Skills</p> <p>C1: Use computers and current software in quantitative and analytical work, as well as general information technology for communication and data handling.</p> <p>C2: Evaluate designs, systems, processes and products to identify areas of potential hazard and environmental threat, and propose improvements.</p> <p>C3: Use laboratory, engineering and measuring equipment to provide data in support of theoretical understanding.</p> <p>C4: Analyze and solve engineering problems, often on the basis of limited and contradictory information.</p>
Teaching and Learning Methods
<p>C1: Computing skills for engineering and science are developed in practical workshops at level 1. Students also learn the principles and study the application of specialist engineering packages.</p> <p>C2 is a major part of the double unit project, and students receive guidance on application of principles studied earlier. C3 is acquired in practical workshop and laboratory sessions.</p> <p>Projects, especially the final year research and design projects will be open-ended, developing C4.</p>
Assessment methods
C1 is assessed through computing assignments, C2 as parts of the major project assessment, and C3 in the marking of laboratory reports. C4: projects will be marked for a critical approach to problem solving.

**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**

D1 is developed in laboratory practical work and design tasks; students for example obtain data from handbooks and computer databases, and use it in calculations, graphical solutions and computer applications.

D2, D3: report-writing and team-working skills are developed in laboratory and project-oriented units throughout the course.

**Assessment Methods**

D1 is assessed in many of the written examination papers, also laboratory and project reports.

Laboratory teachers give students considerable feedback on the quality of written laboratory reports, D2; students discuss this feedback with their personal tutors. The effectiveness of teamwork, D3, is assessed as an element in the major project.

**11. Program Structure**

<b>Level/Year</b>	<b>Course or Module</b>	<b>Course or Module</b>	<b>Credit rating</b>
1 (1 <sup>st</sup> Course)	CES.E.111	Technical English I	2
1 (2 <sup>nd</sup> Course)	CES.E.112	Technical English II	2
1 (1 <sup>st</sup> Course)	CES.E.121	Mathematics I	2
1 (2 <sup>nd</sup> Course)	CES.E.122	Mathematics II	2
1(1 <sup>st</sup> Course)	CES.E.131	Chemical Engineering Principles I	2
1(2 <sup>nd</sup> Course)	CES.E.132	Chemical Engineering Principles II	2
1(1 <sup>st</sup> Course)	CES.E.123	Chemistry	3
1(2 <sup>nd</sup> Course)	CES.E.124	Bio-Chemistry	3
1(1 <sup>st</sup> Course)	CES.E.125	Physics for Environmental Engineering	2
1(2 <sup>nd</sup> Course)	CES.E.126	Engineering Mechanics & Strength of Materials	2

**12. Awards and Credits**

Bachelor Degree Requires ( 240 ) credits



<b>Level/Year</b>	<b>Course or Module</b>	<b>Course or Module</b>	<b>Credit rating</b>
1(1 <sup>st</sup> Course)	CES.E.127	Engineering Drawing	2
1(2 <sup>nd</sup> Course)	CES.E.114	AutoCAD	2
1(1 <sup>st</sup> Course)	CES.E.113	Computer Programming I	2
1(2 <sup>nd</sup> Course)	CES.E.128	Electrical Technology	1
1(1 <sup>st</sup> Course)	CES.E.129	Workshop I	-
1(2 <sup>nd</sup> Course)	CES.E.1210	Workshop II	-
1(2 <sup>nd</sup> Course)	CES.E.115	Human Rights	1
2(1 <sup>st</sup> Course)	CES.E.221	Engineering Mathematics I	2
2(2 <sup>nd</sup> Course)	CES.E.222	Engineering Mathematics II	2
2 (1 <sup>st</sup> Course)	CES.E.231	Energy Balance	2
2(2 <sup>nd</sup> Course)	CES.E.232	Material &Energy Balance	2
2(1 <sup>st</sup> Course)	CES.E.233	Fluid FlowI	3
2(2 <sup>nd</sup> Course)	CES.E.234	Fluid Flow II	3
2(1 <sup>st</sup> Course)	CES.E.235	Physical Chemistry and colloid science	3
2(2 <sup>nd</sup> Course)	CES.E.236	Physical Chemistry	2
2(1 <sup>st</sup> Course)	CES.E.211	Computer Programming II	2
2(2 <sup>nd</sup> Course)	CES.E.212	Computer Programming III	2
2(1 <sup>st</sup> Course)	CES.E.223	Materials Eng. I	2
2 (2 <sup>nd</sup> Course)	CES.E.224	Materials Eng. II	3
2 (1 <sup>st</sup> Course)	CES.E.237	Fuel's Technology	3
2 (2 <sup>nd</sup> Course)	CES.E.238	Fundamentals of Environmental Engineering	2

<b>Level/Year</b>	<b>Course or Module</b>	<b>Course or Module</b>	<b>Credit rating</b>
2 (1 <sup>st</sup> Course)	CES.E.213	Democracy	1
2(2 <sup>nd</sup> Course)	CES.E.225	Eng. Statistics	3
3 (1 <sup>st</sup> Course)	CES.E.331	Thermodynamics I	3
3(2 <sup>nd</sup> Course)	CES.E.332	Thermodynamics II	2
3(1 <sup>st</sup> Course)	CES.E.321	Numerical Analysis	3
3(2 <sup>nd</sup> Course)	CES.E.322	Applied Mathematics in Environmental Engineering	2
3 (1 <sup>st</sup> Course)	CES.E.333	Mass Transfer	3
3(2 <sup>nd</sup> Course)	CES.E.334	Unit Operation I	2
3 (1 <sup>st</sup> Course)	CES.E.335	Chemical Reaction Kinetics	2
3(2 <sup>nd</sup> Course)	CES.E.336	Biochemical Reaction Eng.	2
3(1 <sup>st</sup> Course)	CES.E.337	Heat Transfer I	2
3(2 <sup>nd</sup> Course)	CES.E.338	Heat Transfer II	3
3(1 <sup>st</sup> Course)	CES.E.339	Air Pollution Control Engineering	2
3(2 <sup>nd</sup> Course)	CES.E.3310	Solid Waste Treatment	2
3(1 <sup>st</sup> Course)	CES.E.3311	Industrial Safety	2
3(2 <sup>nd</sup> Course)	CES.E.3312	Environmental Instrumentation and Analysis	3
3(1 <sup>st</sup> Course)	CES.E.3313	Equipment Design	2
3 (2 <sup>nd</sup> Course)	CES.E.3314	Equipment Design in Environmental Engineering Using CAD	3

<b>Level/Year</b>	<b>Course or Module</b>	<b>Course or Module</b>	<b>Credit rating</b>
4 (1 <sup>st</sup> Course)	CES.E.421	Project I	2
4(2 <sup>nd</sup> Course)	CES.E.422	Project II	2
4(1 <sup>st</sup> Course)	CES.E.431	Unit Operations II	3
4(2 <sup>nd</sup> Course)	CES.P.432	Unit Operations III	2
4(1 <sup>st</sup> Course)	CES.E.433	Process Dynamics	2
4(2 <sup>nd</sup> Course)	CES.E.434	Process Control and Instruments	3
4 (1 <sup>st</sup> Course)	CES.E.435	Water and Wastewater Treatment Engineering I	2
4(2 <sup>nd</sup> Course)	CES.E.436	Water and Wastewater Treatment Engineering II	2
4 (1 <sup>st</sup> Course)	CES.E.423	Industrial & Petroleum Pollution Control	2
4(2 <sup>nd</sup> Course)	CES.E.424	Optimization	2
4(1 <sup>st</sup> Course)	CES.E.437	Catalysis and Catalytic Eng.	2
4(2 <sup>nd</sup> Course)	CES.E.439	Corrosion and degradation	2
4(1 <sup>st</sup> Course)	CES.E.438	Environmental Engineering Management and Ethics	2



## 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 Opti on (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
1 (1 <sup>st</sup> Course)	CES.E.111	Technical English I	C													X	X	X	
1 (2 <sup>nd</sup> Course)	CES.E.112	Technical English II	C													X	X	X	
1 (1 <sup>st</sup> Course)	CES.E.121	Mathematics I	C	X	X														
1 (2 <sup>nd</sup> Course)	CES.E.122	Mathematics II	C	X	X														
1 (1 <sup>st</sup> Course)	CES.E.131	Chemical Engineering Principles I	C					X	X										
1 (2 <sup>nd</sup> Course)	CES.E.132	Chemical Engineering Principles II	C					X	X										
1 (1 <sup>st</sup> Course)	CES.E.123	Chemistry	C	X															
1 (2 <sup>nd</sup> Course)	CES.E.124	Bio-Chemistry	C	X															
1 (1 <sup>st</sup> Course)	CES.E.125	Physics for Environmental Engineering		X															
1 (2 <sup>nd</sup> Course)	CES.E.126	Engineering Mechanics & Strength of Materials																	
1 (1 <sup>st</sup> Course)	CES.E.127	Engineering Drawing																	
1 (2 <sup>nd</sup> Course)	CES.E.114	AutoCAD										X	X	X					

## Curriculum Skills Map

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

[illegible]



## Curriculum Skills Map

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

[illegible]



## 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
3 (1 <sup>st</sup> Course)	CES.E.321	Numerical Analysis	C	X	X														
3 (2 <sup>nd</sup> Course)	CES.E.322	Applied Mathematics in Environmental Engineering	C					X	X	X									
3 (1 <sup>st</sup> Course)	CES.E.333	Mass Transfer	C	X	X	X		X	X	X									
3 (2 <sup>nd</sup> Course)	CES.E.334	Unit Operation I	C			X		X	X	X									
3 (1 <sup>st</sup> Course)	CES.E.335	Chemical Reaction Kinetics	C			X		X	X	X									
3 (2 <sup>nd</sup> Course)	CES.E.336	Biochemical Reaction Eng.	C			X		X	X	X									
3 (1 <sup>st</sup> Course)	CES.E.337	Heat Transfer I	C	X		X		X	X	X									
3 (2 <sup>nd</sup> Course)	CES.E.338	Heat Transfer II	C	X		X		X	X	X									
3 (1 <sup>st</sup> Course)	CES.E.339	Air Pollution Control Engineering				X		X	X	X									
3 (2 <sup>nd</sup> Course)	CES.E.3310	Solid Waste Treatment				X		X	X	X									
3 (1 <sup>st</sup> Course)	CES.E.3311	Industrial Safety				X		X	X						X				







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**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 Optio n (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	
4 (1 <sup>st</sup> Course)	CES.E.423	Industrial & Petroleum Pollution Control	C			X		X	X	X										
4 (2 <sup>nd</sup> Course)	CES.E.424	Optimization	C	X	X	X		X									X			
4 (1 <sup>st</sup> Course)	CES.E.437	Catalysis and Catalytic Eng.	C			X		X	X	X										
4 (2 <sup>nd</sup> Course)	CES.E.439	Corrosion and degradation	C			X		X	X	X										
4 (1 <sup>st</sup> Course)	CES.E.438	Environmental Engineering Management and Ethics	C			X	X	X	X	X										