

**1. General information**

**Course:** INTRODUCTION TO CHEMICAL ENGINEERING  
**Type:** CORE COURSE  
**Degree:** 344 - CHEMICAL ENGINEERING  
**Center:** 1 - FACULTY OF SCIENCE AND CHEMICAL TECHNOLOGY  
**Year:** 1

**Main language:** Spanish  
**Use of additional languages:**  
**Web site:**

**Code:** 57703  
**ECTS credits:** 6  
**Academic year:** 2023-24  
**Group(s):** 21  
**Duration:** First semester  
**Second language:** English  
**English Friendly:** Y  
**Bilingual:** N

Lecturer: <b>MARIA TERESA GARCIA GONZALEZ</b> - Group(s): 21				
Building/Office	Department	Phone number	Email	Office hours
Edificio Enrique Costa / Despacho 14	INGENIERÍA QUÍMICA	926052851	teresa.garcia@uclm.es	Mondays, Thursdays and Fridays from 11:30 to 12:30 (contact the teacher in advance).
Lecturer: <b>PAULA SANCHEZ PAREDES</b> - Group(s): 21				
Building/Office	Department	Phone number	Email	Office hours
Enrique Costa Novella. Ingeniería Química. Despacho 8.	INGENIERÍA QUÍMICA	3418	paula.sanchez@uclm.es	Monday to wednesday from 12:00 to 14:00.

**2. Pre-Requisites**

Not required

**3. Justification in the curriculum, relation to other subjects and to the profession**

The objective of "Introduction to Chemical Engineering" is to give an overview of what constitutes Chemical Engineering, with descriptive and qualitative information of Unit Operations and Chemical Process Industries to understand its fundamentals.

This course provides the students the basic skills to be applied in other courses as Fluid Mechanics, Heat Transfer, Environmental Technology, Separation Processes, Chemical Reaction Engineering, Control and Instrumentation of Chemical Processes, and Mass and Energy Balances

**4. Degree competences achieved in this course****Course competences**

Code	Description
E19	Knowledge about material and energy balances, biotechnology, material transfer, separation operations, chemical reaction engineering, reactor design, and recovery and transformation of raw materials and energy resources.
E31	Basic knowledge of the principles of transport phenomena and the kinetic and thermodynamic aspects of chemical processes
E32	Ability to manage information sources in chemical engineering. Properly handle the terminology of the profession in Spanish and English in the oral and written records
G03	Knowledge in basic and technological subjects, which enables them to learn new methods and theories, and give them versatility to adapt to new situations.
G04	Ability to solve problems with initiative, decision making, creativity, critical reasoning and to communicate and transmit knowledge, skills and abilities in the field of Chemical Engineering.
G13	Knowledge of Information and Communication Technologies (ICT).
G14	Proper oral and written communication
G16	Management capacity and information planning
G18	Synthesis capacity
G19	Capacity for teamwork
G20	Ability to analyze and solve problems
G21	Ability to learn and work autonomously
G22	Ability to apply theoretical knowledge to practice
G26	Obtaining skills in interpersonal relationships.

**5. Objectives or Learning Outcomes****Course learning outcomes**

## Description

- To have the ability to handle dimensionally homogeneous and heterogeneous equations.
- To be able to identify the types of chemical reactions and evaluate the operation of the different types of reactors in which they take place.
- To have the ability to handle the sources of information of interest in Chemical Engineering, to prepare reports and to communicate and transmit ideas.
- To know qualitatively the concept and types of basic operations.
- To know qualitatively the environmental and energy implications of the chemical industry.
- To know the origins, evolution and sectors of Chemical Engineering.

To be able to describe a chemical-industrial process, identifying the operating variables, instrumentation and basic control loops.  
To know the methodology to economically evaluate a chemical-industrial process.

## 6. Units / Contents

- Unit 1: History and Evolution of Chemical Engineering
- Unit 2: Technical Documentation and Communication Skills for Chemical Engineers
- Unit 3: The Chemical Processes
- Unit 4: Unit Operations of Chemical Engineering
- Unit 5: Classification of Unit Operation
- Unit 6: Magnitudes and Units
- Unit 7: Dimensional Analysis and Scale-up in Chemical Engineering
- Unit 8: Processes Variables
- Unit 9: Introduction to Transport Phenomena
- Unit 10: Introduction to Chemical Reaction Engineering
- Unit 11: Process Flow Diagram
- Unit 12: Introduction to Control and Instrumentation of Chemical Processes
- Unit 13: Basic Economic Concepts
- Unit 14: Energy
- Unit 15: Introduction to Environmental Engineering

## 7. Activities, Units/Modules and Methodology

Training Activity	Methodology	Related Competences (only degrees before RD 822/2021)	ECTS	Hours	As	Com	Description
Class Attendance (theory) [ON-SITE]	Lectures	E19 E31 E32 G03 G13 G16 G18	1.2	30	N	-	
Computer room practice [ON-SITE]	Practical or hands-on activities	E32 G13 G14 G19 G20 G22 G26	0.25	6.25	Y	N	
Workshops or seminars [ON-SITE]	Project/Problem Based Learning (PBL)	E31 E32 G03 G04 G19 G20 G22 G26	0.6	15	Y	N	
Group tutoring sessions [ON-SITE]	Project/Problem Based Learning (PBL)	E31 E32 G04 G19 G26	0.2	5	Y	N	
Study and Exam Preparation [OFF-SITE]	Self-study	E19 E31 E32 G03 G04 G13 G14 G16 G18 G19 G20 G21 G22 G26	3.6	90	N	-	
Final test [ON-SITE]	Assessment tests	E19 E31 E32 G03 G04 G13 G14 G16 G18 G19 G20 G21 G22 G26	0.15	3.75	Y	Y	
<b>Total:</b>			<b>6</b>	<b>150</b>			
<b>Total credits of in-class work: 2.4</b>			<b>Total class time hours: 60</b>				
<b>Total credits of out of class work: 3.6</b>			<b>Total hours of out of class work: 90</b>				

As: Assessable training activity

Com: Training activity of compulsory overcoming (It will be essential to overcome both continuous and non-continuous assessment).

## 8. Evaluation criteria and Grading System

Evaluation System	Continuous assessment	Non-continuous evaluation*	Description
Assessment of activities done in the computer labs	10.00%	10.00%	Elaborate and/or explain orally a small technical report. The bibliographic sources consulted, the writing and structure of the report, the power-point presentation and the oral communication in the defense will be assessed.
Assessment of problem solving and/or case studies	10.00%	0.00%	Solve adequately the practical situations or cases proposed in tutorials and/or seminars.
Final test	70.00%	90.00%	Taking two partial tests (continuous assessment) or a final test (non-continuous assessment)
Assessment of problem solving and/or case studies	10.00%	0.00%	Submit to the teacher the solved problems (4-6) in an autonomous way and within the required deadline.
<b>Total:</b>	<b>100.00%</b>	<b>100.00%</b>	

According to art. 4 of the UCLM Student Evaluation Regulations, it must be provided to students who cannot regularly attend face-to-face training activities the passing of the subject, having the right (art. 12.2) to be globally graded, in 2 annual calls per subject, an ordinary and an extraordinary one (evaluating 100% of the competences).

### Evaluation criteria for the final exam:

#### Continuous assessment:

- Test (70%)
- Active participation in tutorials and seminars (10%)
- Problem solving and case studies (10%)
- Work in the computer classroom (10%)

#### Non-continuous evaluation:

- All the activities will be evaluated together in the exam except the work in the computer room (10%), which must be done autonomously and handed in to the teacher in due time and form.

**Specifications for the resit/retake exam:**

- All the activities will be evaluated together in the exam except the work in the computer room (10%), which must be done autonomously and handed in to the teacher in due time and form.

**Specifications for the second resit / retake exam:**

- All the activities will be evaluated together in the exam except the work in the computer room (10%), which must be done autonomously and handed in to the teacher in due time and form.

9. Assignments, course calendar and important dates	
Not related to the syllabus/contents	
Hours	hours
<b>Unit 1 (de 15): History and Evolution of Chemical Engineering</b>	
<b>Activities</b>	<b>Hours</b>
Class Attendance (theory) [PRESENCIAL][Lectures]	30
Computer room practice [PRESENCIAL][Practical or hands-on activities]	12.5
Workshops or seminars [PRESENCIAL][Project/Problem Based Learning (PBL)]	10
Group tutoring sessions [PRESENCIAL][Project/Problem Based Learning (PBL)]	5
Study and Exam Preparation [AUTÓNOMA][Self-study]	90
Final test [PRESENCIAL][Assessment tests]	2.5
<b>Global activity</b>	
<b>Activities</b>	<b>hours</b>
Class Attendance (theory) [PRESENCIAL][Lectures]	30
Computer room practice [PRESENCIAL][Practical or hands-on activities]	12.5
Workshops or seminars [PRESENCIAL][Project/Problem Based Learning (PBL)]	10
Group tutoring sessions [PRESENCIAL][Project/Problem Based Learning (PBL)]	5
Study and Exam Preparation [AUTÓNOMA][Self-study]	90
Final test [PRESENCIAL][Assessment tests]	2.5
<b>Total horas: 150</b>	

10. Bibliography and Sources						
Author(s)	Title/Link	Publishing house	Citv	ISBN	Year	Description
CALLEJA, G; GARCÍA, F; DE LUCAS, A; PRATS, D; RODRÍGUEZ, J.M.	Introducción a la Ingeniería Química	Síntesis		9788477386643		Libro base para el seguimiento de la asignatura
MARTÍNEZ DE LA CUESTA, P.J Y RUS MARTÍNEZ, ELOÍSA	Operaciones de Separación en Ingeniería Química. Métodos de Cálculo	Pearson Educación (Prentice Hall)			2004	
COSTA, E.; SOTELO, J.L.; CALLEJA, G., OVEJERO, G.; DE LUCAS, A.; AGUADO, J. Y UGUINA, M.A.	Ingeniería Química 1. Conceptos generales	Alhambra			1983	
COULSON, J.M.; RICHARDSON, J.F.; SINNOTT, R.K.; BACKHURST, J.R.; HARKER, J.H.; PEACOK	Ingeniería Química Tomos I y II	Reverté			1987	
PERRY, R.H. ; GREEN, D.W.	Perry's Chemical Engineer's Handbook.	Mc Graw Hill			1999	
VIAN ORTUÑO, A	El pronóstico económico en química industrial	Eudema, S.A			1991	
VIAN ORTUÑO, A.	Introducción a la química industrial	Reverté			1999	