

COURSE GUIDE – EXTENDED FORM

Academic year 2026 – 2027

1. Program information

1.1 University	University of Oviedo
1.2 Faculty	Faculty of Chemistry
1.3 Department	Chemical and Environmental Engineering
1.4 Field	Chemical Engineering
1.5 Study level	Master
1.6 Specialization	Chemical and Biochemical Process Technology - CBPT

2. Course information

2.1.1 Course name	Emulsion and Suspension Technology		
2.1.2 Course code	MINQUI01-1-11	2.1.3. Course category Fundamental/Specialized/Complementary	S
2.2 Course instructor	Gemma Guitierrez Cervelló		
2.3 Course instructors for applied activities (S, L, P, Pr)	María Matos González		
2.4 Year of study ²	1	2.5 Semester ³	2
2.6 Evaluation type ⁴	E, A	2.7 Course type ⁵	DOB

3. Amount of time estimated for course activities (hours / term)

3.1 Hours /week	2.5	3.2 course	1.3	3.3a sem.	0.5	3.3b laboratory	0.7	3.3c project		3.3.d. practice	
3.4 Total hours from curriculum ⁶	35	3.5 course	18	3.6a sem.	7	3.6b laboratory	10	3.6c project			
Time spent for related activities ⁷										Hours	
Study of recommended books, course support, scientific papers and course notes										30	
Practical skills development										28	
Preparation of seminars / laboratory works / project phases / home works / presentations										25.5	
Evaluation ⁸										3	
Other activities:											
3.7 Total hours of individual study ⁹	86.5										
3.8 Total hours per semestre ¹⁰	121.5										
3.9 Number of credits	4.5										

4. Prerequisites (optional)

4.1 Curriculum ¹¹	
4.2 Learning outcomes	

5. Requirements

5.1 Conditions for course delivery ¹²	Blackboard, video projector
5.2 Seminar / Laboratory / Project delivery requirements ¹³	Blackboard, video projector, laboratory facilities

6. Overall objective of the course

This course aims to study the design of operations in which emulsions, suspensions and colloidal systems are processed.

7. Learning outcomes

Knowledge	The student / graduate will: 1. Have a knowledge and understanding of interface phenomena in multiphase systems. 2. Be able to identify the key characteristics of surfactants, emulsions and other colloidal systems, as well as their main industrial applications.
Skills	The student / graduate will: 3. Be able to explain the behaviour of emulsions and suspensions in different processes, in terms of their stability and interfacial properties.
Responsibility and autonomy	The student / graduate will: 4. Be able to select the appropriate technological processes for the treatment and management of emulsions and suspensions.

8. Teaching methods

Lectures are focused on theoretical or practical activities given in a fundamentally expository way, and supported by graphic material made available to students in advance. Lectures are complemented with practical activities with a high degree of student participation: seminar and laboratory sessions. The seminars are focused on practical learning through problem-solving and the analysis of practical case studies of industrial application. Laboratory sessions are dedicated to conduct laboratory experiments about the techniques of preparation and characterization of colloidal systems, emulsions and suspensions. The students will work in groups under the supervision of a lecturer.

9. Course content

9. 1. Courses ¹⁵	Teaching methods	Time allocation
9.1.1. Interfacial phenomena in polyphase systems.	Interactive lecture. Clarifying explanations.	2 hours
9.1.2. Surfactants: types and applications.		3 hours
9.1.3. Emulsions: fundamentals, formulation and applications.		3 hours
9.1.4. Suspensions: fundamentals, formulation and applications.		3 hours
9.1.5. Nanoparticles fundamentals, formulation and applications.		2 hours
9.1.6. Encapsulation with colloidal system for bioapplications		3 hours
9.1.7. Environmental problems of residual emulsions and suspensions.		2 hours
Course bibliography: <i>Books:</i> Rosen, M.J., Surfactants and Interfacial Phenomena, 3rd ed. John Wiley (2004) Holmberg, K. Jonsson, B.; Kronberg, B.; Lindman, B., Surfactants and Polymers in Aqueous Solutions, John Wiley (2003) M. Matos, D. Pando, G. Gutiérrez, Nanoencapsulation of Food Ingredients by Niosomes In Lipid Base Nanostructures for Food fortification purpose, Elsevier (2019), chapter 11, pages 447-481. M. Matos, R. Díaz, A. Marefati, M. Rayner, G. Gutiérrez, Encapsulation of antioxidants using double emulsions in Food Bioactive Ingredients. Springer (2021), chapter 7. G. Gutiérrez, M. Matos, C. Pazos. Simple emulsion. Encyclopaedia of Membranes, Springer (2014) M. Matos, G. Gutiérrez, C. Pazos. Membrane emulsification and chemical applications. Encyclopaedia of Membranes Springer (2014)		
9.2a Seminar	Working methods ¹⁶	Time allocation
Problem solving. Discussion of practical case studies of industrial use.	Exercises and problem solving	7 hours
9.2b Laboratory	Working methods ¹⁶	Time allocation
Experiment 1. Preparation of colloidal systems using surfactants. Experiment 2. Preparation of emulsions Experiment 3. Preparation of suspensions	Work at the laboratory in groups of students guided by a lecturer.	10 hours
Bibliography for applied activities (seminar / laboratory / project): Same bibliography as courses.		

10. Evaluation

Activity type	10.1 Evaluation criteria	10.2 Evaluation method	10.3 Percentage of the final grade
10.4 Final Exam	Completeness and correctness of knowledge. Degree of mastery of specialized terminology and communication skills. Ability to apply acquired skills. Ability to process data and solve given problems.	Summative assessment test (final evaluation).	50%
10.5a Seminar	Ability to apply learned knowledge in practice. Ability for analysis, personal interpretation, originality, and creativity	Active participation in activities. Assignments.	25%
10.5b Laboratory	Ability to apply learned knowledge in practice. Ability to plan, conduct and interpret laboratory experiments.	Active participation in activities. Report of the laboratory activities.	25%
10.6 Conditions for passing			
Grades from 0 to 10 points will be awarded to each activity of the course. The score of the Final Exam must be, at least, 4 points and the score of the Seminar and Laboratory activities, at least, 5 points. The Final Evaluation of the module is determined by considering the scores and weights assigned to each activity within the course. A minimum grade of 5 certifies the achievement of the minimal learning outcomes required for the course and the awarding of the corresponding study credits.			

Date:

Course instructor: Gemma Guitierrez Cervelló

Course instructors for applied activities: María Matos González

Date of approval by the department:

Head of Department: Manuel Rendueles de la Vega

Date of approval by the Faculty Council:

Dean, José Javier Borge Álvarez