

MODULE	SUBJECT MATTER	YEAR	SEMESTER	CREDITS	TYPE
Food Technology	Food Industries	3º	2º	6	Compulsory
TEACHING STAFF⁽¹⁾			ADDRESS, TELEPHONE NUMBER, EMAIL, ETC. DIRECCIÓN COMPLETA DE CONTACTO PARA TUTORÍAS (Dirección postal, teléfono, correo electrónico, etc.)		
<ul style="list-style-type: none"> Mario Jesús Muñoz Batista José Antonio Vellido Pérez 			Mario Jesús Muñoz Batista Dpto. Ingeniería Química, Facultad de Ciencias 1ª planta, Despacho nº 8 mariomunoz@ugr.es Tel.: 958241000 ext. 20625 José Antonio Vellido Pérez Dpto. Ingeniería Química, Facultad de Ciencias, 2ª Planta, Despacho nº 5, javellido@ugr.es		
			TIMETABLE FOR TUTORIALS OR LINK TO WEBSITE		
			Mario Jesús Muñoz Batista http://sl.ugr.es/mariomunoz José Antonio Vellido Pérez http://sl.ugr.es/javellido		
BELONGS TO UNDERGRADUATE DEGREE PROGRAMME			AND ALSO TO OTHER UNDERGRADUATE DEGREE PROGRAMMES		
Degree in Food Science and Technology					
PREREQUISITES OR RECOMMENDATIONS (where applicable)					

¹ Consult any updates in Acceso Identificado > Aplicaciones > Ordenación Docente

(∞) This course guide should be filled in according to UGR regulations on assessment of student learning: ([http://secretariageneral.ugr.es/pages/normativa/fichasugr/ncg7121/!](http://secretariageneral.ugr.es/pages/normativa/fichasugr/ncg7121/))

Students must have passed the following subjects: Fundamentals of Food Engineering, Unit Operations in the Food Industry and Food Technology I.
BRIEF DESCRIPTION OF CONTENT (ACCORDING TO OFFICIAL VALIDATION REPORT)
Fill in as appropriate
GENERAL AND SPECIFIC COMPETENCES
See Spanish version for details.
OBJECTIVES (EXPRESSED AS EXPECTED LEARNING OUTCOMES)
<p>At the end of the course the students must know/understand:</p> <ul style="list-style-type: none"> • The equipment for size reduction, classification and mixing of solids and their operation. • The basics of the formulation and stability of food emulsions • The techniques and equipment used for emulsification at industrial level • The main fluid-solid operations carried out in the food industry and its fundamentals, as well as the used equipment. • The fundamentals of industrial processing operations (baking, cooking and frying) and the equipment used for the same. <p>Similarly, at the end of the subject the student must be able to:</p> <ul style="list-style-type: none"> • Characterize powdery solids, and interpret size distribution data. • Calculate the energy needs for size reduction of solids. • Calculate the process conditions required for mixing, emulsifying and homogenizing fluids. • Design equipment for carrying out solid-fluid operations such as settling, centrifugation, filtration, fluidization, pressing, crystallization and adsorption. • Describe industrial cooking processes, with a focus on baking, cooking and frying.
DETAILED SYLLABUS
<p>THEORETICAL TOPICS:</p> <ol style="list-style-type: none"> 1. Operations with solid foods Washing and conditioning. Sieving: characterization of solid particles, analysis of granular or powdery products, separation by size. Size reduction: energy requirements, equipment (shredders, grinders and cutters). Mixing: Mixing of powdered and granular solids. 2. Operations with liquid foods



Stirring and mixing: flow patterns in stirred tanks, types of mixers, mixing time, power consumption, and scale-up. Mixing of dough and pastries. Emulsification: emulsifiers, emulsion preparation, equipment. Homogenization: High pressure homogenization, ultrasonic homogenization.

3. Solid-fluid Operations

Sedimentation: terminal velocity, hindered settling, settlers. Centrifugation: centrifugation speed, centrifuges, cyclones. Filtration: Constant pressure or constant flow filtration, filtration equipment, membrane filtration. Pressing: hydraulic press, roller press, screw press. Crystallization: supersaturation, crystallizers. Adsorption: adsorption equilibrium, adsorption equipment.

4. Industrial processing operations

Baking: baking time, baking equipment. Cooking: cooking time, cooking equipment. Frying: Frying oil, oil absorption, frying equipment.

PRACTICES:

Laboratory Practices:

- 1) Solids particle size distribution function fitting (Excel).
- 2) Solids Handling: Sieving, Mixing and Pneumatic transport
- 3) Liquid agitation and mixing. Determination of power consumption.
- 4) Fluidized beds study. Determination of minimum fluidization velocity.

BIBLIOGRAPHY

- Berk Z. Food Process Engineering and Technology. Ed. Academic Press, 2013. UGR electronic library: <https://www.sciencedirect.com/book/9780124159235/food-process-engineering-and-technology>.
- Brennan J.G. y cols. Food Processing Handbook. Ed. Wiley, 2012. UGR electronic library: <https://ebookcentral.proquest.com/lib/ugr/detail.action?docID=693851>.
- Fellows, P. Tecnología del Procesado de los Alimentos: Principios y Prácticas, Ed. Acribia, 2018. Pharmacy faculty library: FFA/664 FEL tec.
- Ordóñez J.A. y cols. Tecnología de los Alimentos. Vol I. Componentes de los Alimentos y Procesos. Ed. Síntesis, 1998. Pharmacy faculty library: FFA/664 TEC tec1.
- Rodríguez F. y cols. Ingeniería de la Industria Alimentaria. Vol. II. Operaciones de Procesado de Alimentos. Ed. Síntesis, 2002. Pharmacy faculty library: FFA/664 ING ing 2.
- McClements D.J. Food Emulsions: Principles, Practice and Techniques. Ed. CRC Press, 2016. Science faculty: FCI/664 MCC foo.

RECOMMENDED LINKS

Fill in text as appropriate

TEACHING METHODOLOGY



ACTIVITY			COMPETENCES	
AF1. Theoretical activities: Main concepts of the subject will be presented using descriptions/deductions and slide presentations.			CB1, CE4, CE6	
AF1, AF2. Problems solving: Some numerical problems related to the topics of the course will be solved.			CB2, CB4, CB5, CG2, CG4, CG7, CG8, CG11	
AF2. Lab practices: Working with lab pieces of equipment and acquisition of experimental data both at the laboratory and pilot plant scales.			CB3, CG3, CG4	
AF2, AF3. Seminars and workshops. Analysis of data and utilization of software to prepare lab reports.			CB3, CT2, CB5, CG11	
AF10, AF11. Works: Students will develop bibliographic works or solution of numerical problems related to the content of the course.			CB1, CB2, CB3, CB4, CB5, CG1, CG3, CG4, CG7, CG8, CG11	
AF6. Tutorship: Individual or group resolution of doubts and particular situations.				
PROGRAM				
In-person activities			Non- In-person activities	
Theoretical sessions/ problems solution (horas)	Lab sessions (horas)	Presentations and seminars (horas)	Individual work (horas)	Group work (horas)
40	15	5	75	15
ASSESSMENT (ASSESSMENT INSTRUMENTS, CRITERIA AND PERCENTAGE VALUE OF FINAL OVERALL MARK, ETC.)				
CONTINUOUS ASSESSMENT				
Assessment instrument			Percentage value	
SE1. Theory/problem test. It will consist of numerical problems and theoretical questions. A minimum of 4 points of 10 (maximum) will mandatory to pass the course by continuous assessment.			70%	
SE2. Lab practices test. It will be mandatory to attend 100% of the practical sessions (an excused absence is admitted) and to obtain a minimum of 3 points of 10 (maximum) in the lab practices test to pass the course by continuous assessment.			15%	
SE3. Development and presentation of works.			10%	



SE4. Attendance and participation.	5%						
EXTRAORDINARY ASSESSMENT It will be applied exclusively to students who do not pass the course in the ordinary test for June.							
<table border="1"> <thead> <tr> <th data-bbox="145 423 1058 456">Assessment instrument</th> <th data-bbox="1058 423 1458 456">Percentage value</th> </tr> </thead> <tbody> <tr> <td data-bbox="145 456 1058 622"> SE1. Theory/problem test. It will consist of numerical problems and theoretical questions. A minimum of 5 points of 10 (maximum) will be mandatory to pass the course by continuous assessment. </td> <td data-bbox="1058 456 1458 622">80%</td> </tr> <tr> <td data-bbox="145 622 1058 792"> SE2. Lab practices. Marks obtained in the ordinary call of June or a test of the lab practices. For the last case, it will be mandatory to obtain a minimum of 5 points of 10 (maximum) to pass the course by continuous assessment. </td> <td data-bbox="1058 622 1458 792">20%</td> </tr> </tbody> </table>	Assessment instrument	Percentage value	SE1. Theory/problem test. It will consist of numerical problems and theoretical questions. A minimum of 5 points of 10 (maximum) will be mandatory to pass the course by continuous assessment.	80%	SE2. Lab practices. Marks obtained in the ordinary call of June or a test of the lab practices. For the last case, it will be mandatory to obtain a minimum of 5 points of 10 (maximum) to pass the course by continuous assessment.	20%	
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DESCRIPTION OF THE EXERCISES WHICH WILL CONSTITUTE SINGLE FINAL ASSESSMENT AS ESTABLISHED IN UGR REGULATIONS							
Single final assessment							
<table border="1"> <thead> <tr> <th data-bbox="145 987 1058 1021">Assessment instrument</th> <th data-bbox="1058 987 1458 1021">Percentage value</th> </tr> </thead> <tbody> <tr> <td data-bbox="145 1021 1058 1187"> SE1. Theory/problem test. It will consist of numerical problems and theoretical questions. A minimum of 5 points of 10 (maximum) will be mandatory to pass the subject by continuous assessment. </td> <td data-bbox="1058 1021 1458 1187">80%</td> </tr> <tr> <td data-bbox="145 1187 1058 1388"> SE2. Lab practices. Test of the lab practices. It will consist of a practical test in the lab and/or numerical problems and questions. It will be mandatory to obtain a minimum of 5 points of 10 (maximum) to pass the course. </td> <td data-bbox="1058 1187 1458 1388">20%</td> </tr> </tbody> </table>	Assessment instrument	Percentage value	SE1. Theory/problem test. It will consist of numerical problems and theoretical questions. A minimum of 5 points of 10 (maximum) will be mandatory to pass the subject by continuous assessment.	80%	SE2. Lab practices. Test of the lab practices. It will consist of a practical test in the lab and/or numerical problems and questions. It will be mandatory to obtain a minimum of 5 points of 10 (maximum) to pass the course.	20%	
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SCENARIO A (ON-CAMPUS AND REMOTE TEACHING AND LEARNING COMBINED)							
TUTORIALS							
TIMETABLE (According to Official Academic Organization Plan)	TOOLS FOR TUTORIALS (Indicate which digital tools will be used for tutorials)						



Mario Jesús Muñoz Batista http://sl.ugr.es/mariomunoz José Antonio Vellido Pérez http://sl.ugr.es/javellido	Videoconferencias Foros de Prado Correo electrónico
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MEASURES TAKEN TO ADAPT TEACHING METHODOLOGY

- **AF1. Theoretical activities:** Main concepts of the subject will be presented using descriptions/deductions videos and slide presentations. It will be in-person activities as long as the capacity of the classroom allows maintaining the sanitary recommendations. Otherwise, it will be made by videoconference.
- **AF1, AF2. Problems solving:** Some numerical problems related to the topics of the course will be solved. It will be in-person activities as long as the capacity of the classroom allows maintaining the sanitary recommendations. Otherwise, it will be made by videoconference.
- **AF2. Lab practices:** Working with lab pieces of equipment and acquisition of experimental data both at the laboratory and pilot plant scales. It will be in-person activities as long as the capacity of the classroom allows maintaining the sanitary recommendations. Otherwise, it will be made by videoconference. If necessary, complementary videos will be used to describe the studied processes and the experimental data provided to the students to carry out the reports.

MEASURES TAKEN TO ADAPT ASSESSMENT (Instruments, criteria and percentage of final overall mark)

Ordinary assessment session

Assessment instrument	Percentage value
SE1. Theory/problem test. It will consist of numerical problems and theoretical questions. A minimum of 4 points of 10 (maximum) will mandatory to pass the subject by continuous assessment.	70%
SE2. Lab practices test. It will be mandatory to attend 100% of the practical sessions (an excused absence is admitted) and to obtain a minimum of 3 points of 10 (maximum) in the lab practices test to pass the course by continuous assessment.	15%
SE3. Development and presentation of works.	10%
SE4. Attendance and participation.	5%

Extraordinary assessment session

Assessment instrument	Percentage value
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SE1. Theory/problem test. It will consist of numerical problems and theoretical questions. A minimum of 5 points of 10 (maximum) will mandatory to pass the subject by continuous assessment.	80%
Lab practices. Marks obtained in the ordinary call of June or a test of the lab practices. For the last case, it will be mandatory to obtain a minimum of 5 points of 10 (maximum) to pass the course by continuous assessment.	20%

Single final assessment

Assessment instrument	Percentage value
SE1. SE1. Theory/problem test. It will consist of numerical problems and theoretical questions. A minimum of 5 points of 10 (maximum) will mandatory to pass the subject by continuous assessment.	80%
SE2. Lab practices. Test of the lab practices. It will consist of a practical test in the lab and/or numerical problems and questions. It will be mandatory to obtain a minimum of 5 points of 10 (maximum) to pass the course.	20%

SCENARIO B (ONCAMPUS ACTIVITY SUSPENDED)

TUTORIALS

TIMETABLE

(According to Official Academic Organization Plan)

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TIMETABLE

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MEASURES TAKEN TO ADAPT TEACHING METHODOLOGY

- **AF1. Theoretical activities:** Main concepts of the subject will be presented using descriptions/deductions videos and slide presentations by videoconferencing.
- **AF1, AF2. Problems solving:** Some numerical problems related to the topics of the course will be solved by videoconferencing.
- **AF2. Lab practices:** Complementary videos will be used to describe the studied processes and the experimental data provided to the students to carry out the reports.



MEASURES TAKEN TO ADAPT ASSESSMENT (Instruments, criteria and percentage of final overall mark)**Ordinary assessment session**

Assessment instrument	Percentage value
SE1. Theory/problem test. It will consist of numerical problems and theoretical questions. A minimum of 4 points of 10 (maximum) will mandatory to pass the subject by continuous assessment.	70%
Lab practices test. It will be mandatory to attend 100% of the practical sessions (an excused absence is admitted) and to obtain a minimum of 3 points of 10 (maximum) in the lab practices test to pass the course by continuous assessment.	15%
SE3. Development and presentation of works.	10%
SE4. Attendance and participation.	5%

Extraordinary assessment session

Assessment instrument	Percentage value
SE1. Theory/problem test. It will consist of numerical problems and theoretical questions. A minimum of 5 points of 10 (maximum) will mandatory to pass the course by continuous assessment.	80%
SE2. Lab practices. Marks obtained in the ordinary call of June or a test of the lab practices. For the last case, it will be mandatory to obtain a minimum of 5 points of 10 (maximum) to pass the course by continuous assessment.	20%

Single final assessment

Assessment instrument	Percentage value
SE1. Examen teoría/problemas. Constará de cuestiones teóricas y resolución de problemas sobre los temas 1 al 4. Será obligatorio obtener una calificación mínima de 5 puntos sobre 10 para superar la asignatura.	80%



SE2. Lab practices. Test of the lab practices. It will consist of numerical problems and questions. It will be mandatory to obtain a minimum of 5 points of 10 (maximum) to pass the course.	20%
ADDITIONAL INFORMATION (if necessary)	

