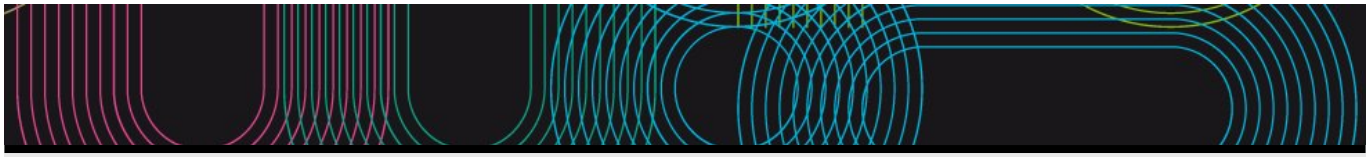

IDENTIFYING DATA				
Food Biotechnology				
Subject	Food Biotechnology			
Code	V02M074V01204			
Study programme	(*)Máster Universitario en Biotecnoloxía Avanzada			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	3	Optional	1st	2nd
Teaching language	Spanish			
Department	Functional Biology and Health Sciences External			
Coordinator	Sieiro Vázquez, Carmen Becerra Fernández, Manuel			
Lecturers	Becerra Fernández, Manuel González Siso, María Isabel Leiro Vidal, José Manuel Sieiro Vázquez, Carmen			
E-mail	manu@udc.es mcsieiro@uvigo.es			
Web	http://http://masterbiotecnologiaavanzada.com/index.php/plan-docente/materias			
General description	The subject will cover the production, processing and preservation of food by microorganisms and/or enzymes, as well as the production of raw materials, additives and adjuvants used in the food industry. In all cases, the different processes will be studied according to the substrates employed, the characteristics of the microorganisms used as regards the metabolic activities they develop in these substrates, as well as the selection and improvement of the microorganisms for the optimization of the processes.			

Competencies	
Code	
C21	(*)CEO1.- Coñecer os recursos microbianos, vexetais e animais de interese biotecnolóxica, así como as súas aplicacións na industria alimentaria e agropecuaria.
C22	(*)CEO2.- Coñecer, saber deseñar e controlar os procesos de produción nas industrias alimentaria e agropecuaria.
D1	
D2	
D3	
D4	
D5	
D6	
D7	
D8	
D9	
D10	
D11	
D12	
D13	
D14	
D15	

Learning outcomes	
Expected results from this subject	Training and Learning Results

1. To Identify the different applications that the microbial, plant and animal resources have in biotechnology in the field of food and agriculture.	C21 D1 D3 D7 D11
2. To develop production protocols based on the design and control of processes in the food and agricultural industries.	C22 D2 D3 D4 D5 D6 D10
3. To identify and recover from the specialized literature the information necessary for the resolution of the posed problems.	D1 D2 D3 D13
4. To use and apply simple experimental designs based on the hypothetical-deductive method in order to obtain and interpret data and draw conclusions.	D1 D4 D5
5. Predisposition to update and adapt in accordance with the new sector technologies.	D12 D13 D15
6. To identify and describe the different applications that microbiology has in biotechnology, both in the biomedical, agri-food and environmental fields.	C21 C22 D1 D8
7. Concern about the role of biotechnology in a globalized world.	C21 D12 D15
8. To use an appropriate logical structure and appropriate language for the non-specialist public. Ability to present topics to experts in the fied.	D1 D6 D8 D15
9. To understand and practice the dynamics of teamwork. To develop management and organizational skills.	D9 D14

Contents

Topic	
Lesson1. Introduction: Microbial resources. Food produced by micro-organisms.	(*)
Lesson 2. Alcoholic beverages biotechnology.	(*)
Lesson 3. Biotechnology of meat products.	(*)
Lesson 4. Biotechnology of food additives of microbial origin.	(*)
Lesson 5. Biotechnology of enzymes of food interest.	(*)
Lesson 6. Biotechnology of dairy products.	(*)
Lasson 7. Biotechnology of SCP production.	(*)
Lesson 8. Functional foods.	(*)

Planning

	Class hours	Hours outside the classroom	Total hours
Lecturing	15	22.5	37.5
Laboratory practices	4.5	0	4.5
Studies excursion	4	0	4
Supervised work	0	5	5
Group tutoring	0.5	0	0.5
Objective questions exam	2	6	8
Practices report	0	4.5	4.5
Report of external practices	0	4	4
Essay	0	7	7

*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

Methodologies

	Description

Lecturing	Presentation, by the teacher, of the contents on the matter under study, theoretical bases and/or guidelines of a work, exercises or projects to be developed by the students.
Laboratory practices	Students will gain experience in the characterization and selection of microorganisms used in the food industry. The objectives of the practice as well as the results obtained and their comparative interpretation should be reflected in a report to be submitted for evaluation.
Studies excursion	Students will make a practical visit to one of the surrounding food industries, where they will have the opportunity to study the entire production process. This study will be reflected in a report to be submitted for evaluation.
Supervised work	Students will work, in groups and led by the teaching staff, on certain theoretical aspects of the program through the search for information and the resolution of cases and issues. The work will deal with an innovative topic (new products or modification of the same, new producing organisms. . .) related to Food Biotechnology. The results of the work should be reflected in a report to be submitted for evaluation.
Group tutoring	The students will have interviews with the teaching staff of the subject in order to receive advice on the different activities they have to develop and solve doubts. The teaching staff, for their part, will supervise the evolution of the students.

Personalized attention

Methodologies	Description
Lecturing	It will be carried out through tutorials arranged between the teaching staff and the students, in person, by videoconference or by e-mail.
Laboratory practices	It will be carried out through tutorials arranged between the teaching staff and the students, in person, by videoconference or by e-mail.
Group tutoring	It will be carried out between the coordinator of the subject and the students.
Supervised work	It will be carried out through tutorials arranged between the teaching staff and the students, in person, by videoconference or by e-mail.

Assessment

	Description	Qualification	Training and Learning Results	
Lecturing	Objective test about the contents of the Master sessions.	50	C21 C22	D4 D10 D11 D13 D15
Laboratory practices	-Systematic observation during the practices (5%). -Report, in groups, on laboratory practices (15%). The students will have a rubric detailing the aspects that will be evaluated.	20	C21 C22	D1 D2 D3 D5 D6 D8 D9 D10 D11 D12 D13 D14 D15
Studies excursion	The interest of the students during the visit, their curiosity, any questions they may have and a report on the visit will be assessed. This report will relate and integrate the content of the visit with the knowledge acquired in the subject. The students will have a rubric detailing the aspects that will be evaluated.	10	C22	D4 D7 D10 D12 D15
Supervised work	Two reports on the supervised projects (each of them will represent 10% of the evaluation). In these reports the student will relate and integrate the matter with the knowledge acquired in the subject and its preparation will be supervised by the teachers. The students will have a rubric that detailing the aspects that will be evaluated.	20	C21 C22	D1 D2 D3 D5 D7 D8 D11 D13

Other comments on the Evaluation

A grade of 5/10 is required to pass the course.

It is essential to obtain a minimum grade of 4/10 in each of the activities in order to pass the course.

The grade of the activities graded with a minimum of 4 may be saved, if desired by the student, for the second and/or subsequent calls, in which he or she must only present the exam for the not passed activities.

The activities will be evaluated continuosly during the sessions of the subject (or on an alternative date agreed by both students and teachers) and the objective test on the date set by the Academic Commission of the Master's Degree (1st opportunity: 26-03-2019 from 15:00-16:00 h) and 2nd opportunity: 01-07-2019 from 16:00-17:00 h).

Both the timetable of classes and the dates of exams can be consulted in the following link:

http://masterbiotecnologiaavanzada.com

The activities will be evaluated continuosly during the sessions of the subject (or on an alternative date agreed by both students and teachers) and the objective test on the date set by the Academic Commission of the Master's Degree (1st opportunity: 26-03-2019 from 15:00-16:00 h) and 2nd opportunity: 01-07-2019 from 16:00-17:00 h).

Both the timetable of classes and the dates of exams can be consulted in the following link:

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Sources of information

Basic Bibliography

Hutkins, R.W., **Microbiology and technology of fermented foods**, First ed., IFT Press ; Ames (Iowa) : Blackwell Publishing, 2006.

Glazer, A.N. and Nikaido, H., **Microbial biotechnology: Fundamentals of applied microbiology**, 2nd ed., Cambridge : Cambridge University Press, 2008.

Lee, B.H., **Fundamentals of Food Biotechnology, 2nd Edition**, 2nd ed., Wiley-Blackwell, 2015.

Joshi, V.K., **Biotechonolgy: Food Fermentation. Microbiology, Biochemistry and Technology. Volumen I y II**, First ed., V.K. Joshi and Ashok Pandey (Eds.), 1999.

Complementary Bibliography

Burgeois C.M. y Larpent J.P., **Microbiología alimentaria. Volumen II. Fermentaciones alimentarias**, First ed., Acribia, 1995.

Codex Alimentarius, http://www.codexalimentarius.net/web/index_es.jsp,

Recommendations

Subjects that continue the syllabus

Internships/V02M074V01302
Final Year Dissertation/V02M074V01301

Subjects that are recommended to be taken simultaneously

Food Analysis, Food Safety and Traceability/V02M074V01205
Animal Biotechnology/V02M074V01206
Applied Biotechnology for Sustainable Development/V02M074V01207
Plant Biotechnology/V02M074V01217
Environmental Pollution/V02M074V01208

Subjects that it is recommended to have taken before

Legal and Ethical Aspects in Biotechnology/V02M074V01203
Auditing Biotech Companies/V02M074V01202
Bioinformatics/V02M074V01104
Industrial Biotechnology/V02M074V01105
Genomics and Proteomics/V02M074V01103
Genetic Engineering and Transgenesis/V02M074V01101
Organisation and Management: Business Management and the Efficient Management of a Laboratory/V02M074V01201
Biotechnological Processes and Products/V02M074V01106
Application Techniques in Biotechnology/V02M074V01107