



IDENTIFYING DATA

Genetics I

Subject	Genetics I			
Code	V02G030V01404			
Study programme	(*)Grao en Bioloxía			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Mandatory	2nd	2nd
Teaching language	Spanish English			
Department	Biochemistry, Genetics and Immunology			
Coordinator	Morán Martínez, María Paloma Canchaya Sanchez, Carlos Alberto			
Lecturers	Canchaya Sanchez, Carlos Alberto Carvajal Rodríguez, Antonio Fernández Silva, Íria Morán Martínez, María Paloma Rolán Álvarez, Emilio			
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General description	<p>The contents of the Course Genetic I include: Mendelian Genetics. Linkage And recombination. Structure and organisation of the DNA. Replication, mutation and repair. Gene expression and its regulation. Genetic engineering. After taking Genetics I, the students will have to know and comprehend:</p> <ul style="list-style-type: none"> <input type="checkbox"/> The mechanisms of the inheritance. <input type="checkbox"/> The structure and function of the nucleic acids. <input type="checkbox"/> The expression, replication, transmission and modification of the genetic material. <input type="checkbox"/> The genetic regulation and the genetic bases of development. 			

Competencies

Code	
A1	Students should prove understanding and knowledge in this study field that starts in the Secondary Education and with a level that, even though it is supported in advanced books, also includes some aspects that involve knowledge from the vanguard of the study field.
A2	Students should know how to apply their knowledge to their work or vocation in a professional way. They also should have the competences that are usually proved through the elaboration and defence of arguments and the resolution of problems within their study field.
A3	Students should prove ability for information-gathering and interpret important data (usually within their study field) to judge relevant social, scientific or ethical topics.
A4	Students should be able to communicate information, ideas, issues and solutions to all audiences (specialist and unskilled audience).
B2	Ability of reading and analyzing scientific papers and having critical assessment skills to understand data collection, deducing the main idea from the least relevant ones and basing on the corresponding conclusions.
B3	Acquisition of general knowledge about the basic subjects of biology, both at theory and experimental level, without dismissing a higher specialization in subjects that are oriented to a concrete professional area.
B4	Ability in handling experimental tools, both scientific and computer technology equipment that support the search for solutions to problems related to the basic knowledge of biology and with those of a concrete labour context.
B5	Understanding of the levels of organization of living beings from a structural (molecular, cellular and organic) and functional point of view by observing their relations with the environment and other organisms, as well as their appearances in situations of environmental alteration.
B7	Collection of information about issues of biologic interest, analysis and emission of critical opinions and reason them including the reflection about social and/or ethical aspects related to the issue.
B10	Development of analytic and abstraction skills, the intuition and the logical and rigorous thought through the study of biology and its uses.

B11	Ability to communicate in detail and clearly: knowledge, methodology, ideas, issues and solutions to all audiences (not only qualified but unskilled in Biology).
B12	Ability to identify their own educational necessities in the biology field and in concrete labour areas and to organize their learning with a high grade of autonomy in any context.
C3	Identifying, analysing and characterizing biological samples, including those of human origin, and possible anomalies.
C4	Isolating, analysing and identifying biomolecules, viruses, cells, tissues and organs.
C7	Manipulating and analysing genetic data and carrying out genetic counseling
C10	Analysing and assessing the adaptation of living beings to the environment.
C16	Growing, producing, transforming, improving biological resources as well as getting profits.
C20	Designing, using and supervising biotechnological processes.
C21	Processing and interpreting bioassays and biological diagnoses.
C24	Designing biological process models.
C25	Gathering background information, develop experimental work and analysing data results
C31	Knowing and handling technical and scientific apparatus.
C32	Knowing and handling basic or specific key concepts and terminology
C33	Understanding the social projection of Biology.
D1	Development of capacity of analysis and synthesis
D2	Acquisition of the organization and planning capacity for tasks and time
D3	Development of oral and writing communication abilities
D4	Acquisition of foreign language knowledge related to the study field
D5	Use of computer resources related to the study field
D6	Research and interpreting of information from different sources
D7	Resolution of issues and decision making in an effective way
D8	Development of the ability of independent learning
D9	Ability to work in collaboration or creating groups with an interdisciplinary character
D10	Development of the critical thinking
D11	Adquisition of an ethical agreement with the society and the profession
D12	Respectful behaviour to diversity and multiculturalism
D13	Sensitivity for environmental issues
D14	Adquisition of abilities in the interpersonal relationships
D15	Development of creativity, initiative and entrepreneurial spirit
D16	Acceptance of a quality commitment
D17	Development of the self-criticism ability
D18	Development of negotiating power

Learning outcomes

Expected results from this subject	Training and Learning Results			
New	A3	B3 B5	C4 C7	D1 D6 D8 D10
New	A3	B3 B4 B5	C3 C4 C7 C10	D4 D6 D8 D10
New	A3	B4 B5	C3 C21 C24	D1 D4 D6 D8
New	A2 A3	B4 B5 B7	C3 C4 C7 C20 C21 C31	D1 D2 D13 D15
New	A1 A2 A3	B5 B7 B10	C10	D9 D13 D15 D17
New	A1 A2 A3 A4	B3 B4 B5	C7	D11 D12 D16 D18

New	A1 A2 A3	B3 B4 B5 B7	C4 C16 C20	D6 D7 D16
New	A2 A3	B2 B3 B10 B11	C25 C31 C32	D3 D5 D7
New	A1 A3 A4	B10 B11 B12	C33	D14 D16 D17 D18
New	A1 A2 A3	B3 B4	C31 C32	D1 D4 D6

Contents

Topic	
Transmission of the hereditary material	Inheritance and chromosomes. Segregation and independent transmission. Gene interaction. Inheritance and environment. Resolution of problems on mendelian and mitochondrial inheritance.
Linkage and genetic maps	Genetic Linkage and recombination. Chromosomal cartography in eukaryotes. Resolution of problems of linkage and genetic maps.
Nature and replication of the hereditary material	Nature and structure of the hereditary material. The replication of the DNA. Organisation of the DNA in the chromosomes. Methods of study of the DNA. Resolution of problems on DNA and on inheritance of mutations of DNA.
Expression of the genetic information.	Gene transcription. Genetic code. Translation. Resolution of problems on translation and transcription and on inheritance of mutations that affect these processes.
Regulation of the gene expression	Regulation of the gene expression in prokaryotes. Regulation of the gene expression in eukaryotes. Resolution of problems of gene regulation in prokaryotes and eukaryotes and on inheritance of mutations that affect to these processes.
Program of Lab sessions	Management of Drosophila in the laboratory Blood groups and genealogical trees Recombination in Sordaria Restriction Genetic Maps Bacterial transformation

Planning

	Class hours	Hours outside the classroom	Total hours
Lecturing	15	45	60
Problem solving	9	36	45
Seminars	3	0	3
Laboratory practices	20	6	26
Previous studies	0	14	14
Problem solving	0	1	1
Short answer tests	0	1	1

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

Methodologies

	Description
Lecturing	They will follow the course schedule. They are organized in lessons, 50 minutes each. In most cases, it is dedicated to explain and develop the contents of the course (concepts and methodologies), but due to time constraints, students needs to complete them (before and after lectures), by self-study using textbooks, complementary readings, computer animations, and reference web pages.

Problem solving	The purpose of working through problems is to better understand the concepts covered during theoretical lectures. A number of problems (available in TEMA) will be assigned throughout the semester. These will be collected periodically as they will be graded in the class time. This is a compulsory task. Students may be called upon to solve examples of the completed problems (on the board on their corresponding due dates).
Seminars	The seminars will take place in small groups and they will be dedicated to review basic concepts required to successfully complete the course
Laboratory practices	The aims of the laboratory sessions are to present to the student experimental procedures related to the course. Students are expected to read the corresponding lab material BEFOREHAND. The contents of the lab sessions are connected with the contents of the lectures both theoretical and problem-solving, so that their content is also part of the knowledge necessary to pass the course.
Previous studies	Genetics is a difficult subject. There is a lot of material to learn it. Genetics is also a problem-based course. It will be necessary to memorize many concepts, organize information, draw conclusions, and solve problems. We recommend at least 2-3 hours of study for every hour of lecture. In order to verify that the learning outcomes are acquired according to the course schedule, you have to use the electronic platform TEMA. Here, students will find (in Spanish and English) lecture presentations, supplementary readings, learning material, laboratory guides, problems with complete answers and explanations, and online self-assessment tests.

Personalized attention

Methodologies	Description
Lecturing	The process of learning of the student will complement by means of the development of activities no presenciales through the platform of teledocencia SUBJECT. The students can interact with the professor in regard to the contained of the discipline through tutoría individualizada stop the resolution of questions , or by mail electronic by the platform SUBJECT. In this platform the student will find the material with the presentations of the classes of theory, complementary readings, documents to complete and study the theoretical classes, the script of practices, smart of problems, and exame of autoavaliación.
Problem solving	The process of learning of the student will complement by means of the development of activities no presenciales through the platform of teledocencia SUBJECT. The students can interact with the professor in regard to the contained of the discipline through tutoría individualizada stop the resolution of questions , or by mail electronic by the platform SUBJECT. In this platform the student will find the material with the presentations of the classes of theory, complementary readings, documents to complete and study the theoretical classes, the script of practices, smart of problems, and exame of autoavaliación.
Previous studies	The students will be able to do queries to the professors envelope the contents of the subject during it time of tutorías of each docente and through others half electronic (email and in active forums in the platform SUBJECT).
Laboratory practices	

Assessment

	Description	Qualification	Training and Learning Results			
Laboratory practices	Attendance and performance in the laboratory sessions. A multiple choice type questions will take place at the end of each laboratory session. Attendance to laboratory sessions is mandatory. For repeating students, grade obtained on the previous year will be kept. So that, only for them attendance will be voluntary	10	A1	B10	C21	D1
			A2	B12	C24	D2
			A3		C32	D6
			A4			D14
Previous studies	Work outside the classroom. In order to obtain grading, each student must have their own set of completed problems to turn in before due dates and each student should follow the learning sequence in TEMA (multiple-choice test resolution, download supplementary materials among other activities) for all the units.	10	A1	B2	C3	D1
			A2	B3	C4	D2
			A3	B4	C7	D3
			A4	B5	C10	D4
				B7	C16	D5
				B10	C20	D6
				B11	C21	D7
				B12	C24	D8
					C25	D9
					C31	D10
					C32	D11
					C33	D12
						D13
						D14
						D15
						D16
						D17
						D18

Problem solving 50% of written exams will consist of problem solving		40	A1	B2	C3	D1
			A2	B3	C4	D3
			A3	B4	C7	
				B5	C10	
				B7	C16	
				B10	C20	
				B11	C21	
				B12	C24	
					C25	
					C31	
					C32	
					C33	
Short answer tests	50% of written exams will consist of answering short questions about theoretical concepts	40	A1	B2	C7	D12
			A2	B3	C10	D16
			A3	B4	C24	D17
			A4	B5	C25	
				B7	C32	

Other comments on the Evaluation

Evaluation

The calendar of the tests is in this link: <http://bioloxia.uvigo.es/en/teaching/exams> **1. Evaluation in June**

Option A

- One mid-term exam (**non-cumulative**) (20% of the final grade) . It involves lectures and problem- solving material.
- Cumulative final exam (60% of the final grade) . It will be necessary to obtain at least 4 points (out of 10) to pass the exam. It will consist of short questions (50%) and problem solving (50%) being necessary to obtain at least 2 in theory and 2 in problem solving. That is to say, the subject can not be overcome if the 4 points are obtained only in the theory part or in the problems part.
- Attendance and performance in the laboratory session. (10% of the final grade) . A multiple choice type questions will take place at the end of each laboratory session. **Attendance to laboratory session is mandatory. For repeating students , grades obtained the previous year will be kept. So that, only for them, attendance will be voluntary.**
- Work outside the classroom (10% of final grade) . In order to obtain grading, each student must have their own set of completed problems to turn in before due dates and each student should follow the learning sequence in TEMA (multiple-choice test resolution, download supplementary materials among other activities) for all the units.

Option B (for students who do not attended the mid-term exam)

- A single **final exam (90% of final grade)**. In this exam, it will be necessary to obtain at least 5 points to pass the subject.
- **Attendance and performance in the laboratory sessions. (10% of the final grade)**. A multiple choice type questions will take place at the end of each laboratory session. Attendance to laboratory sessions is mandatory. For repeating students, grade obtained on the previous year will be kept. So that, only for them attendance will be voluntary

2. Evaluation in July (and ☐Extraordinary☐)

Unique option

- Final exam (90% of final grade). In this exam, it will be necessary to obtain at least 5 points to pass the subject.
- Attendance and performance in the laboratory sessions. (10% of the final grade). A multiple choice type questions will take place at the end of each laboratory session. **Attendance to laboratory sessions is mandatory. For repeating students, grade obtained on the previous year will be kept. So that, only for them attendance will be voluntary.**

Students who are absent from the exam will not be graded

Academic Ethics:

- Cheating in this course will not be tolerated.
- Cheating includes but is not limited to: plagiarism, copying during the exams, falsifying documentation related to absences, use of unauthorized electronic devices during an exam
- Penalties for cheating can include failing course

Sources of information

Basic Bibliography

Complementary Bibliography

Benito Jiménez, César, **141 problemas de genética : resueltos paso a paso**, 1, Síntesis, 2015

Benito Jiménez, César, **Genética: Conceptos esenciales**, 1, Médica Panamericana, 2012

Mensúa, Jose Luis, **Genética: problemas y ejercicios resueltos**, 1, Alhambra, 2003

Klug, Cummings & Spencer, **Klug, Cummings, Spencer**, 10, Pearson, 2013

Pierce, Benjamin A., **Genética : un enfoque conceptual**, 5, Médica Panamericana, 2015

Watson, Baker, Bell, Gann, Levine, Losick, **Biología molecular del gen**, 7, Médica Panamericana, 2016

Pierce, Benjamin A., **Genetics essentials : concepts and connections**, W.H. Freeman and Company, 2016

Hartwell, Leland H., **Genetics : from genes to genomes**, 5, McGraw-Hill Education, 2015

Hartl, Daniel L., **Genetics : analysis of genes and genomes**, 7, Jones and Bartlett, 2009

Recommendations

Subjects that continue the syllabus

Genetics II/V02G030V01505

Subjects that are recommended to be taken simultaneously

Biochemistry I/V02G030V01301

Biochemistry II/V02G030V01401

Subjects that it is recommended to have taken before

Biology: Evolution/V02G030V01101

Biology: Basic laboratory techniques/V02G030V01203