



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				
Coordinator	Quesada Rodríguez, Humberto Carlos Canchaya Sanchez, Carlos Alberto			
Lecturers	Canchaya Sanchez, Carlos Alberto Carvajal Rodríguez, Antonio Fernández Silva, Íria Morán Martínez, María Paloma Pérez Pereira, Noelia Quesada Rodríguez, Humberto Carlos Soto Vazquez, Jose Luis Tomás López, Laura			
E-mail	hquesada@uvigo.es canchaya@uvigo.es			
Web				
General description	The contents of the Course Genetic I include: Mendelian Genetics. Linkage and recombination. Structure, replication and organisation of the DNA. Gene expression and its regulation. After taking Genetics I, the students will have to know and comprehend: ☐ The mechanisms of the inheritance. ☐ The structure and function of the nucleic acids. ☐ The expression, replication, transmission and modification of the genetic material. ☐ 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			
Know and comprise the structure and function of the nucleic acids	A3	B3 B5	C4 C7	D1 D6 D8 D10
Know and comprise the expression, replication, transmission and modification of the genetic material	A3	B3 B4 B5	C3 C4 C7 C10	D4 D6 D8 D10
Know and comprise the genetic regulation and the genetic bases of the development	A3	B4 B5	C3 C21 C24	D1 D4 D6 D8
Apply knowledge of the genetics to isolate, identify, handle and analyse specimens and samples of biological origin, including virus, as well as to characterise his cellular and molecular constituents	A2 A3	B4 B5 B7	C3 C4 C7 C20 C21 C31	D1 D2 D13 D15
Analyse and interpret the adaptations of the living beings to the half	A1 A2 A3	B5 B7 B10	C10	D9 D13 D15 D17
Manipulate and analyse the genetic material and carry out genetic advice	A1 A2 A3 A4	B3 B4 B5	C7	D11 D12 D16 D18

Apply knowledges and relative technology to the genetics in appearances related with the production, exploitation, analysis and diagnostic of processes and biological resources	A1 A2 A3	B3 B4 B5 B7	C4 C16 C20	D6 D7 D16
Obtain information, develop experiments and interpret the results	A2 A3	B2 B3 B10 B11	C25 C31 C32	D3 D5 D7
Comprise the social projection of the genetics and his repercussion in the professional exercise	A1 A3 A4	B10 B11 B12	C33	D14 D16 D17 D18
Know and handle the concepts, terminology and scientific instrumentation-technical relative to the genetics	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.
Linkage and genetic maps	Genetic Linkage and recombination. Chromosomal cartography in eukaryotes.
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.
Expression of the genetic information.	Gene transcription. Genetic code. Translation.
Regulation of the gene expression	Regulation of the gene expression in prokaryotes. Regulation of the gene expression in eukaryotes. Development genetics

Planning

	Class hours	Hours outside the classroom	Total hours
Lecturing	21	52.5	73.5
Problem solving	7	21	28
Laboratory practical	20	6	26
Autonomous practices through ICT	0	22.5	22.5

*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 need 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).
Laboratory practical	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. There will be 5 practical sessions lasting 4 hours each with the following topics: 1.- Drosophila management in the laboratory, 2.-Blood groups and family trees, 3.-Recombination in fungi, 4.-restriction enzymes, and 5.-Bacterial transformation.

Autonomous practices through ICT	One of the competences that the university student must achieve throughout his / her training is the ability to work autonomously. It is necessary to provide non-contact activities that guide this learning. In order for the learning to be carried out according to the progress of the course, the TEMA platform will be used.
----------------------------------	---

Personalized assistance

Methodologies	Description
Lecturing	The students can interact with the professor in relation to any aspect of the discipline through personalized tutoring for the resolution of questions, or by mail through the TEMA platform.
Problem solving	The students can interact with the professor respect to any subject related to the resolution of practical problems during the class, using personalized tutoring, or by mail trough the TEMA platform.
Laboratory practical	The student will have access through the TEMA platform to all the documentation of each practice: script of practices, presentations used in class, and complementary information of each practice. Students can interact directly with the teacher during the development of each practical session to clarify questions or expand concepts, or through email through the TEMA platform.
Autonomous practices through ICT	The learning process of the student that complements the master classes and the practices will be carried out through the development of non-contact activities through the platform of teledocencia TEMA. In this platform the student will find the material with the presentations of the theory classes, complementary readings, useful documents to study, the script of practices, lists of problems and exercises that must realize in a given term, and self-assessment exams. The teachers will reserve a time to attend and resolve the doubts of the students. In these activities the teacher has as a function to guide and guide the process of student learning and help him to successfully complete the corresponding autonomous work. The teachers will indicate the first days of class the place, day and hours for that personalized attention.

Assessment

	Description	Qualification	Training and Learning Results			
Lecturing	SEE DETAILS IN OTHER COMMENTS. - Two mid-term exams - One final exam	40	A1 A2 A3	B2 B3 B5 B10	C3 C4 C7 C10 C16 C21 C25 C31 C32 C33	D1 D2 D4 D6 D7 D8 D10 D11 D15 D16 D17
Problem solving	SEE DETAILS IN OTHER COMMENTS. - Two mid-term exams - One final exam	40	A1 A2 A3 A4	B2 B3 B10 B12	C10 C20 C24 C31 C32	D1 D7 D8 D10 D15 D17
Laboratory practical	SEE DETAILS IN OTHER COMMENTS. - Attendance and performance - A multiple choice test 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 A2 A3 A4	B10 B12	C21 C24 C32	D1 D2 D6 D14
Autonomous practices through ICT	SEE DETAILS IN OTHER COMMENTS - Online self-evaluations - Presentation of exercises within the established period	10				

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

- Two mid-term exam (25% of the final grade). It involves theory and problem- solving material.
- One final exam (55% of the final grade). It involves theory and problem- solving material. It will be necessary to obtain at least 4 points (out of 10) to pass the exam. If this minimum grade is not obtained, the final mark in the subject will be obtained with the global qualifications if it is less than 5, or 4.5 if it is greater than 5.
- Attendance and performance in the laboratory session (10% of the final grade). A multiple choice type test 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 for all the units.
- To overcome the subject, it will be necessary to obtain 5 points out of 10 in the weighted global of the evaluations.

All grades, except the final exam, will be saved for the 2nd opportunity in July. For subsequent courses, only the qualification of practices will be saved.

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. Extraordinary Evaluations

Unique option

- One final exam (90% of final grade). It involves theory and problem- solving material. 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

Teaching timetable: <http://bioloxia.uvigo.es/es/docencia/horarios>

Sources of information

Basic Bibliography

Complementary Bibliography

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

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

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

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
