

Guía docente / *Course Syllabus*

2018-19

1. Descripción de la Asignatura / *Course Description*

Asignatura <i>Course</i>	GENÉTICA (docencia en inglés)
Códigos <i>Code</i>	202114
Facultad <i>Faculty</i>	Facultad de Ciencias Experimentales
Grados donde se imparte <i>Degrees it is part of</i>	Grado en Biotecnología
Módulo al que pertenece <i>Module it belongs to</i>	Fundamentos de biología, microbiología y genética
Materia a la que pertenece <i>Subject it belongs to</i>	Genética
Departamento responsable <i>Department</i>	Biología Molecular e Ingeniería Bioquímica
Curso <i>Year</i>	1º
Semestre <i>Tern</i>	2º
Créditos totales <i>total credits</i>	6
Carácter <i>Type of course</i>	Básica
Idioma de impartición <i>Course language</i>	Inglés
Modelo de docencia <i>Teaching model</i>	B1

Clases presenciales del modelo de docencia B1 para cada estudiante: 27 horas de enseñanzas básicas (EB), 18 horas de enseñanzas prácticas y de desarrollo (EPD) y 0 horas de actividades dirigidas (AD). Hasta un 10% de la enseñanza presencial puede sustituirse por docencia a distancia (también presencial, pero posiblemente asincrónica), de acuerdo con la programación de la Asignatura publicada antes del comienzo del curso.

Number of classroom teaching hours of B1 teaching model for each student: 27 hours of general teaching (background), 18 hours of theory-into-practice (practical group tutoring and skill development) and 0 hours of guided academic activities. Up to 10% of face-to-face sessions can be substituted by online teaching, in accordance with the course schedule published before it begins.

2. Responsable de la Asignatura / *Course Coordinator*

Nombre <i>Name</i>	Juan Jiménez Martínez
Departamento <i>Department</i>	Biología Molecular e Ingeniería Bioquímica
Área de conocimiento <i>Field of knowledge</i>	Genética
Categoría <i>Category</i>	Catedrático de Universidad
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3. Ubicación en el plan formativo / *Academic Context*

Breve descripción de la asignatura <i>Course description</i>	"Genetics" is a general subject conceived to acquire basic concepts and methods on molecular genetics, genetic analysis, population genetics and molecular evolution, which is also essential to deepen in successive more specialized genetic subjects.
Objetivos (en términos de resultados del aprendizaje) <i>Learning objectives</i>	During the academic course, students must understand the mechanisms of functioning and transmission of the genetic material at different levels (molecular, individual and population), both in a context of basic science and biotechnological application. Its objectives include understanding the origin of natural biodiversity, learning genetic tools used in biotechnological processes and services, and acquiring the necessary knowledge to deepen the study of genetics in more specialized subjects. From a methodological point of view, this course approaches the study of Genetics in a deductive process, based mainly on the integration of learning and reasoning, applied to the resolution of problems and its conclusions. The deductive method is also applied in the Practical Teachings, at the same time that the laboratory routine is introduced during practical classes.
Prerrequisitos <i>Prerequisites</i>	No prerequisites are required. It is important to have basic notions of Physics, Chemistry, Cell Biology and Statistics.
Recomendaciones <i>Recommendations</i>	Genetics is a deductive subject, mainly based on logical learning more than in memoristic one, so continued attendance in class is essential in order to keep the thread of argument that guides the entire subject. Familiarization with bibliographic databases and scientific literature such as "pubmed" is also advisable.
Aportaciones al plan formativo <i>Contributions to the educational plan</i>	"Genetics" provides the basis for understanding natural biodiversity, the tools to use it in biotechnological processes and services, and the knowledge to deepen in successive more specialized genetic subjects. It explains the mechanisms of

functioning and transmission of genetic material at different levels (molecular, individual and population) and puts these in both an applied biotechnological context and basic scientific research. The subject belongs to the block of basic subjects of the branch of Sciences in the Degree of Biotechnology (Module Fundamentals of Biology, Microbiology and Genetics). In this context, the subject is interrelated with aspects dealt with in the subjects "Cell Biology" (cell cycle, life cycles, differentiation, etc.) and "Biomolecules" (Structure of DNA and Proteins, translation, biochemical routes, etc.), also in the first year. It also deals with subjects that serve as a basis for the subjects "Genetic Engineering" and "Molecular Genetics" in the second year; "Bioinformatics" in the third year and Animal Biotechnology in the fourth year, in addition to several optional subjects.

4. Competencias / Skills

<p>Competencias básicas de la Titulación que se desarrollan en la Asignatura <i>Basic skills of the Degree that are developed in this Course</i></p>	<p>CB1 - Que los estudiantes hayan demostrado poseer y comprender conocimientos en un área de estudio que parte de la base de la educación secundaria general, y se suele encontrar a un nivel que, si bien se apoya en libros de texto avanzados, incluye también algunos aspectos que implican conocimientos procedentes de la vanguardia de su campo de estudio</p> <p>CB2 - Que los estudiantes sepan aplicar sus conocimientos a su trabajo o vocación de una forma profesional y posean las competencias que suelen demostrarse por medio de la elaboración y defensa de argumentos y la resolución de problemas dentro de su área de estudio</p> <p>CB3 - Que los estudiantes tengan la capacidad de reunir e interpretar datos relevantes (normalmente dentro de su área de estudio) para emitir juicios que incluyan una reflexión sobre temas relevantes de índole social, científica o ética</p> <p>CB4 - Que los estudiantes puedan transmitir información, ideas, problemas y soluciones a un público tanto especializado como no especializado</p> <p>CB5 - Que los estudiantes hayan desarrollado aquellas habilidades de aprendizaje necesarias para emprender estudios posteriores con un alto grado de autonomía</p>
<p>Competencias generales de la Titulación que se desarrollan en la Asignatura <i>General skills of the Degree that are developed in this Course</i></p>	<p>CG1 - Conocer y comprender los procesos biológicos generales desde un punto de vista molecular, celular, fisiológico y, en su caso, de comunidades, de los seres vivos.</p> <p>CG4 - Comprender el método científico. Conocer, entender y aplicar las herramientas, técnicas y protocolos de experimentación en el laboratorio y adquirir las capacidades de observación e interpretación de los resultados obtenidos.</p> <p>CG5 - Adquirir las habilidades adecuadas a cada una de las materias impartidas, mediante la descripción, cuantificación, análisis y evaluación crítica de los resultados experimentales obtenidos de forma autónoma.</p> <p>CG6 - Trabajar de forma adecuada en un laboratorio biológico, químico o bioquímico, conociendo y aplicando las normativas y técnicas relacionadas con seguridad e higiene, manipulación de animales de laboratorio y gestión de residuos.</p> <p>CG7 - Cultivar y manipular células animales, vegetales y microorganismos.</p> <p>CG9 - Desarrollar los métodos de adquisición, interpretación y</p>

	<p>análisis de la información biológica junto con una comprensión crítica de los contextos apropiados para su uso, mediante el estudio de manuales, monografías, ensayos, artículos originales, etc.</p> <p>CG10 - Utilizar la literatura científica y técnica de vanguardia, adquiriendo la capacidad de percibir claramente los avances actuales y los posibles desarrollos futuros</p> <p>CG14 - Ser capaz de implicarse en el desarrollo actual de la biotecnología y sus aplicaciones, así como de los aspectos filosóficos y éticos implicados.</p> <p>CG16 - Ser capaz de concienciar a otros sobre la importancia de las aportaciones de la biotecnología a los debates y controversias que su desarrollo genera y como este conocimiento y su comprensión mejora la generación de una opinión informada sobre la calidad y sostenibilidad de los recursos.</p> <p>CG23 - Saber analizar, sintetizar y utilizar el razonamiento crítico en ciencia.</p> <p>CG25 - Desarrollar la capacidad creativa que incentive el dinamismo y la capacidad emprendedora e innovadora así como la identificación de las analogías entre situaciones que permita la aplicación de soluciones conocidas a nuevos problemas.</p> <p>CG26 - Comprender la aplicabilidad de los conocimientos que se requieren, a la tarea profesional de un biotecnólogo, no sólo a pequeña escala, sino desde un punto de vista amplios y beneficiosos al conjunto de la sociedad.</p> <p>CG27 - Demostrar una correcta visión integrada del proceso de I+D+i y ser capaz de interrelacionar y conectar los ámbitos del conocimientos que engloba la biotecnología, desde los principios biológicos y fisicoquímicos a los nuevos conocimientos científicos, para el desarrollo de aplicaciones concretas y la introducción en el mercado de nuevos productos biotecnológicos de interés.</p>
<p>Competencias transversales de la Titulación que se desarrollan en la Asignatura</p> <p><i>Transversal skills of the Degree that are developed in this Course</i></p>	
<p>Competencias específicas de la Titulación que se desarrollan en la Asignatura</p> <p><i>Specific competences of the Degree that are developed in the Course</i></p>	<p>CE50 - Resolver razonadamente problemas genéticos básicos siendo capaz de valorar, interpretar y aplicar el resultado obtenido para generar una respuesta o una conclusión.</p> <p>CE51 - Saber diseñar y ejecutar una metodología experimental de laboratorio con objeto de resolver problemas genéticos reales usando para ello organismos modelo y técnicas y materiales típicos de un nivel experimental básico.</p> <p>CE54 - Saber utilizar herramientas básicas de la genética bacteriana y aplicarla tanto a la investigación básica como a sus aplicaciones biotecnológicas.</p> <p>CE70 - Deducir posibles funciones de genes, proteínas y metabolitos en función de patrones de expresión, interacciones, localización, o fenotipos de pérdida de función.</p> <p>CE77 - Diseñar estrategias genéticas para abordar un problema biológico.</p> <p>CE78 - Inferir rutas genéticas a partir de fenotipos de mutantes y de cambios de expresión.</p> <p>CE82 - Saber diseñar y ejecutar bien los diferentes pasos de un protocolo de purificación de DNA y de RNA de una muestra biológica, así como determinar su secuenciación.</p>

Competencias particulares de la asignatura, no incluidas en la memoria del título
Specific skills of the Course, not included in the Degree's skills

In a broad point of view, the subject develops the ability to solve out problems on genetics, to expose them in public, teamwork, and initiatives in the biotechnology word.

The students who pass the subject "Genetics" must be able to:

- Apply the knowlegments in Molecular Genetics, Genetic Analysis, Population Genetics and Molecular Evolution to salve out genetic issues and problems.
- Obtain a global and interconnected vision of all the concepts learned.
- Understand the origin and connotations of genetic diversity.
- Manage the method of scientific reasoning.
- Know the structure of scientific articles distinguishing between descriptive, methodical, experimental and review scientific publications.
- Interpret research results presented in experimental articles.
- Manage basic laboratory techniques and execute simple protocols successfully.
- Analyze the results of genetic crosses with real model organisms.

5. Contenidos de la Asignatura: temario / *Course Content: Topics*

PARTE I	THE GENOME
TEMA 1	THE GENETIC INFORMATION
1.1	Structure of the Nucleic Acids
1.2	Structure and Organization of the Genome
TEMA 2	DUPLICATION OF THE GENETIC MATERIAL
2.1	DNA replication
2.2	Replication as a scientific and biotechnological tool
PARTE II	THE FUNCTION OF THE GENETICS INFORMATION
TEMA 3	FROM GENES TO PROTEINS
3.1	Transcription. Transcriptional units and the concept of gene
3.2	Translation. The genetics codes. Estructure and function of proteins
TEMA 4	CONTROL OF THE GENETIC ACTIVITY
4.1	Genetic control elements
4.2	Epigenetics
PARTE III	CHANGES IN THE GENETIC INFORMATION
TEMA 5	DNA ALTERATIONS
5.1	Spontaneous and induced mutations
5.2	mechanisms of DNA repair
TEMA 6	PHENOTYPIC EFFECTS OF MUTATIONS
6.1	Functional consequences of mutations
6.2	Mutation's reversion
PARTE IV	GENETICS ANALYSIS
TEMA 7	THE INHERITANCE OF THE GENES
7.1	Life cycles: mitosis and meiosis
7.2	Meiotic errors: numeric cariotypic alterations
TEMA 8	GENETICS ANALISIS OF HAPLOID AND HAPLO-DIPLOID ORGANISMS
8.1	Complementation analysis
8.2	Linkage and recombination analysis

TEMA 9	GENETICS ANALISIS OF DIPLOID ORGANISMS
9.1	Mendelian segregation
9.2	Interdependence among genes
9.3	Exceptions to the mendelian segregation
PARTE V	POPULATION GENETICS AND EVOLUTION
TEMA 10	GENES IN EVOLUTION
10.1	Genes in popilations
10.2	Molecular evolution

6. Metodología y recursos / *Methodology and Resources*

Metodología general <i>Methodology</i>	The study of Genetics is mainly based on the integration of learning and reasoning, so that problem solving and drawing conclusions are the basic method of learning and evaluation. As this is a general subject, personal work is important to establish the concepts presented in class.
Enseñanzas básicas (EB) <i>General teaching</i>	Theoretical classes are the main source of learning. These classes handle diverse audiovisual material and online demonstrations to avoid routines and make them attractive. Students must actively participate in classes, where more than an "explanation", a "deduction" is pursued with the participation of everyone. The syllabus consists of 10 chapters with two topics on average in each. Knowledge and understanding of each topic is assessed on a continuous basis through 2 partial exams, and active participation in class is encouraged through the occasional proposal of a topic, which students should prepare for discussion during the next class.
Enseñanzas prácticas y de desarrollo (EPD) <i>Theory-into-practice</i>	<p>Laboratory practices</p> <p>The practices in the laboratory are aimed at learning and assimilating important concepts and tools in Genetics with "your own hands", as well as introducing the routine of the laboratory (security, protocols, handling of material, analysis of results, etc.). There are two obligatory and evaluable practices throughout the course. The practices should not be understood as something accessory, but rather as a structural part of the subject where you must acquire knowledge and skills that can be evaluated in the midterm and final test.</p> <p>Series of problems</p> <p>In order to encourage continuous assessment and regularly updated personal work, the subject provides four series of problems that you can do in group or individually. These problems are solved and debated in class by randomly selected students, who must be able to reason out the answers.</p>
Actividades académicas dirigidas (AD) <i>Guided academic activities</i>	<p>Biotechnological ideas</p> <p>It is offered, on a voluntary basis, the possibility of writing a proposal, based on its own ideas and supported with scientific articles, about biotechnological approaches that could lead to a new biotechnology product or service. The maximum length of the work is 20,000 characters (with spaces).</p> <p>Practical problems</p> <p>During the course, a practical problem of genetic analysis will be proposed (to be solved voluntarily, maximum of one per student). This problem consists of explaining a real case of genetic</p>

segregation in corn, an activity that complements the theoretical aspects of the genetic analysis in eukariots. The resolution of these practical problems is carried out with an ear of corn and a questionnaire, which are collected in the practice laboratory.

Given the additional and voluntary nature of these activities, the score obtained on them will only be effective during the academic year when basic activities have been passed.

7. Criterios generales de evaluación / *Assessment*

<p>Primera convocatoria ordinaria (convocatoria de curso) <i>First session</i></p>	<p>El 40% de la calificación procede de la evaluación continua. El 60% de la calificación procede del examen o prueba final. 40% of the score comes from continuous evaluation. 60% of the score comes from the exams (either partial or final). The subject maintains a continuous evaluation system throughout the course. Attendance at practical classes is necessary to acquire the skills and knowledge of genetic analysis, and the attendance and knowledge acquired through a test in each practice is evaluated. The continuous attendance to classes is fundamental not to lose the argumental thread. Theoretical knowledge is evaluated through problem solving, which is carried out in four problems series (one every 2-3 chapters of the syllabus), and in two partial exams, carried out halfway through and at the end of the academic course respectively. Scores can be improved with optional complementary activities such as solving practical problems, developing an original biotechnological idea, or actively participating in topics proposed in class. The final exam assesses theoretical and practical knowledge through an evaluation of the first and second parts of the course, which coincides with subject matter assessed in the first and second partial exam. The final test is only for students who have not passed the partial exams, or who wish to repeat them in order to opt for a better score. Partial exams, like the final exam, account for 60% of the grade. The remaining 40% corresponds to the other activities of continuous evaluation, which are maintained in the first and second convocatories of final exams.</p>
<p>Segunda convocatoria ordinaria (convocatoria de recuperación) <i>Second session (to re-sit the exam)</i></p>	<p>The same criteria as in the first call is applied. Exceptionally, if the student has not followed the system of continuous evaluation, or renounces to it, a single global examination is carried out that includes all the theoretical and practical aspects of the course evaluated over a maximal score of 10.</p>
<p>Convocatoria extraordinaria de noviembre <i>Extraordinary November session</i></p>	<p>Se activa a petición del alumno siempre y cuando éste esté matriculado en todas las asignaturas que le resten para finalizar sus estudios de grado, tal y como establece la Normativa de Progreso y Permanencia de la Universidad. Se evaluará del total de los conocimientos y competencias que figuren en la guía docente del curso anterior, mediante el sistema de prueba única. It is activated at the student's request, provided that the student is enrolled in all the subjects remaining to complete his or her undergraduate studies, as established in the University's Progress and Permanence Regulations. The total amount of knowledge and skills included in the teaching guide for the previous academic year will be evaluated using the single test system.</p>

<p> Criterios de evaluación de las enseñanzas básicas (EB) <i>General teaching assessment criteria</i> </p>	<p> Durante la evaluación continua: In order to facilitate the continuous evaluation, two partial tests, each one evaluated over 3 points, will be carried out by the middle of the semester and at the end of it, respectively. It will be necessary to obtain a minimum of 1.5 points in each part to pass the subject and to add points of the rest of the basic activities (series of problems up to 2 points and practices up to 2 points). Those students who have not passed the minimum of 1.5 points in any of the partial exams will be examined in the final exam in the first and second call, but only of the not passed partial matter (eventually of both). Durante el examen o prueba final (1ª convocatoria): During the final exam or test (1st call): Two exams are carried out, of the same nature and content as the two partial exams carried out during the continuous assessment. It is taken by students who have not passed the partial exams, or who wish to increase its score. Exceptionally, in the absence of continuous evaluation, a single global exam is carried out on all the theoretical-practical subject of the course evaluated over 10. Durante el examen o prueba final (2ª convocatoria): During the final exam or test (2nd and other calls): As in the first call. Exceptionally, in the absence of continuous evaluation, a single global exam is carried out on all the theoretical-practical subject of the course evaluated over 10. </p>
<p> Criterios de evaluación de las enseñanzas prácticas y de desarrollo (EPD) <i>Theory-into-practice assessment criteria</i> </p>	<p> Durante la evaluación continua: During continuous assessment: Practices The practices must be understood as topics of the course that are complemented with a practical approach, where the student follows an experimental process to acquire the corresponding competences. There will be 2 practical series, each one evaluated over a maximum of 1 point. The attendance to the practices is obligatory to pass the subject. With an unjustified absence, the score in that section will not count in the main activities. With two or more unjustified absences, the subject may not be passed. After each session, a test/questionnaire will be carried out on the practical procedures of the laboratory and/or competences assimilated in the practical sessions. A component of this score may depend on the individual results of each practice. Practices are an integral part of the course and as such, the skills (not laboratory methodology) learned in them will be subject to evaluation in partial or final examinations. Problem Series There are 4 sets of problems during the semester, each assessed on a maximum of 0.5 points. The problem solving classes are considered an evaluation activity and will be included in the calendar for this purpose, always before the exams. During the course, the corresponding series are available on line. The student have a few days to solve out the problems of the serie. The answers will be delivered handwritten on the day provided for the resolution of each serie. Answers and reasoning of each problem or section will be explained in class by a student chosen at random from among those who deliver the solutions. If the chosen student has presented a correct answer but is not present or is unable to reason with it, he/she will automatically lose the points corresponding to ALL the series of problems. Durante el examen o prueba final (1ª convocatoria): During the final exam (1st call): The score obtained in EPD activities during the continuous evaluation is the one considered in the final test. </p>

	<p>Exceptionally, in the absence of continuous evaluation, a single global exam is carried out on all the theoretical-practical subject of the course evaluated over 10.</p> <p>Durante el examen o prueba final (2ª convocatoria): During the final exam (2nd call): as in the first call.</p>
<p> Criterios de evaluación de las actividades académicas dirigidas (AD) <i>Criteria of assessment of guided academic activities</i> </p>	<p>Durante la evaluación continua: These activities are voluntary, and their score will be added to the final score provided that the minimum requirements for passing the subject in the basic activities have been reached.</p> <p>Biotechnological ideas Most biotechnology companies arise from scientific knowledge. Throughout the course, each student will be able to present a brief project of an original idea that could give rise to a biotechnology-based company, supported by scientific articles. Ideas must be protected, so these works are treated with absolute confidentiality. The short project idea must be presented as a written work of a maximum of 20,000 characters (including spaces), describing a summary with the idea and its application, the scientific result on which it is based, an introduction to the current topic, the development with scientific results or observations have given rise to your business idea, and some final conclusions about the new product or service that would be generated, the sector of society to which it is addressed, and where appropriate, the competitive advantage over equivalent products/services that already exist in the market. At the end, the references of the articles used for the work and that are cited in it must be included.</p> <p>In the university library there are recent issues of these journals, and in many cases, they are also available "on line" accessible through the web page of the University (only from computers of the University or through the server of the library after identification as a UPO student), located in the section of electronic journals (http://www.upo.es/serv/bib/revelec.htm). You can also search many journals at once using the database known as "medline" (http://www.ncbi.nlm.nih.gov/PubMed). For some articles, full access to the entire text are available.</p> <p>Work on biotechnological ideas will be delivered to the teacher in electronic format via the virtual facility. The deadline for submission will normally coincide with the day of the final exam in June. This work may receive a maximum of 0.25 points.</p> <p>Practical problems. In the last part of the semester, each student will be able to collect an ear of corn from the practice laboratory, which they will be able to analyse for one day. The ear contains grains with different genetic characteristics (colour and/or roughness). The student must count the frequency of the different types of grain and deduce the genes involved in the character, the type of inheritance that best explains this segregation, and the genotype of this maize and its parents. The work will be carried out by filling in a template sheet available in the laboratory. This voluntary activity will be evaluated on 0.25 points.</p> <p>Active participation in class Occasionally, questions are asked in class about some important experiment in the history of genetics, or that allows important results to be predicted. Everyone must make the effort to solve it, but the student who explains it to the others in the next class</p>

	<p>obtains up to 0.1 additional points in the partial exam corresponding to that subject (maximum 0.2 points in this activity).</p> <p>Durante el examen o prueba final (1ª convocatoria): During the final exam or test (1st call): The score obtained in the EPD during the continuous evaluation is the one considered in the final test.</p> <p>Durante el examen o prueba final (2ª convocatoria): During the final examination or test (2nd convocation): as in the first call</p>
<p>Puntuaciones mínimas necesarias para aprobar la Asignatura</p> <p><i>Minimum passing grade</i></p>	<p>1ª convocatoria: 1st call: The evaluation of the subject is continuous and modular. It consists of several scoring activities: The Basic activities (EB and EPD) that compute and define the minimums to pass the subject, and the Complementary Directed Activities (AD), which are eminently voluntary and can serve to raise the level of the final score ones the subject is passed.</p> <p>In order to pass the subject, a score equal to or greater than 1.5 (out of 3) must be obtained in each of the two partial exams (EB) and at least 5 points in the sum of the basic activities (EB+EPD). Only when these criteria are satisfied will the score obtained in complementary directed activities (AD) be added to obtain the final score of the course.</p> <p>In summary, in order to pass the subject it is necessary to obtain 5 (out of 10) in basic activities, with a minimum of 1.5 (out of 3) in the exams of each part.</p> <p>2ª convocatoria: 2nd call: As in the first call, 5 (out of 10) is required in basic activities (EB and EPD), with a minimum of 1.5 (out of 3) in the examination of each part (EB).</p>
<p>Material permitido</p> <p><i>Materials allowed</i></p>	<p>Calculator and ordinary writing material.</p>
<p>Identificación en los exámenes</p> <p><i>Identification during exams</i></p>	<p>En cualquier momento de la realización de una prueba de evaluación los profesores podrán requerir la acreditación de la identidad de cualquier estudiante, mediante la exhibición de su carnet de estudiante, documento nacional de identidad, pasaporte u otro documento válido a juicio del examinador. Si no lo hiciese, el estudiante podrá continuar la prueba, que será calificada solo si la documentación es presentada en el plazo que el examinador establezca.</p>
<p>Observaciones adicionales</p> <p><i>Additional remarks</i></p>	<p>At any time during the performance of an evaluation test, teachers may require the accreditation of the identity of any student, by showing their student card, national identity document, passport or other document valid at the discretion of the examiner. If not, the student will be able to continue the test, which will be considered only if the documentation is presented within the period established by the examiner.</p> <p>Aside it, exams must be signed by the student.</p>

Los estudiantes inmersos en un programa de movilidad o en un programa de deportistas de alto nivel, así como los afectados por razones laborales, de salud graves o por causas de fuerza mayor debidamente acreditadas, tendrán derecho a que en la convocatoria de curso se les evalúe mediante un sistema de evaluación de prueba única. Para ello, deberán comunicar la circunstancia al profesor responsable de la asignatura antes del fin del periodo docencia presencial.

Students enrolled in a mobility program or a program for high-level athletes, as well as students affected by work or serious health problems or reasons of force majeure duly accredited, will have the right to be evaluated during the first session through a single test evaluation system. To do this, they must report changes in their circumstances to the program coordinator before the end of the teaching period.

8. Bibliografía / Bibliography

<p>Manual</p>	<ul style="list-style-type: none"> • Snustad and Simmons (2016) “Principles of Genetics”, <i>Wiley. 7th Edition</i> • Watson y col (2014) “Molecular Biology of the gene”, <i>Pearson. 7th Edition</i> • William S. Klug, Michael R. Cummings, Charlotte A. Spencer, Michael A. Palladino (2013) “Conceptos de Genética”, <i>Pearson, 10th Edition</i> • Jocelyn E. Krebs y cols (2013) “Genes XI”, <i>ones & Bartlett. 11th Edition</i> • Russell P.J (2000) “Fundamentals of Genetics”, <i>Addison Wesley Longman. 2nd Edition</i>
<p>Monography</p>	<ul style="list-style-type: none"> • Brown T.A (2017) “Genomes IV”, <i>Garland Science. 4th Edition. ISBN: 978-0815345084</i> • Jiménez y Jiménez (2000) “Genética Microbiana”, <i>Síntesis. ISBN: 9788477385929</i> • Fontdevilla y Moya (1999) “Introducción a la genética de poblaciones”, <i>Síntesis. ISBN 9788477386919</i>
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