UAB
Universitat Autònoma de Barcelona

Mathematics

Code: 101968
ECTS Credits: 6

2025/2026

Degree	Type	Year
Genetics	FB	1

Contact

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Teaching groups languages

You can view this information at the end of this document.

Prerequisites

The same that give access to the degree

Objectives and Contextualisation

This course aims to convey mathematical knowledge that is essential for any science with a quantitative component, as it is the case with genetics. More specifically, it will focus, on the one hand, on the functions of one variable and the infinitesimal calculus, and on the other hand on the tools of probability and statistics. In both cases, the primary goal will be to understand the concepts and to argue correctly. Of course, it will also be about making these concepts operational, but always knowing what is being done and why. Finally, a third objective is to introduce some computer tools, especially in relation to the treatment of statistical data.

Competences

- Act with ethical responsibility and respect for fundamental rights and duties, diversity and democratic values.
- Apply knowledge of theory to practice.
- Be able to analyse and synthesise.
- Develop creativity.
- Know, apply and interpret the basic procedures of mathematical calculation, statistical analysis and IT, the use of which is indispensable in genetics and genomics.
- Make changes to methods and processes in the area of knowledge in order to provide innovative responses to society's needs and demands.
- Reason critically.
- Take account of social, economic and environmental impacts when operating within one's own area of knowledge.
- Take sex- or gender-based inequalities into consideration when operating within one's own area of knowledge.

Learning Outcomes

1. Act with ethical responsibility and respect for fundamental rights and duties, diversity and democratic values.
2. Apply knowledge of theory to practice.
3. Apply the basic elements of the calculation of functions and statistical analysis to genetic and biological examples.
4. Be able to analyse and synthesise.
5. Develop creativity.
6. Make changes to methods and processes in the area of knowledge in order to provide innovative responses to society's needs and demands.
7. Reason critically.
8. Take account of social, economic and environmental impacts when operating within one's own area of knowledge.
9. Take sex- or gender-based inequalities into consideration when operating within one's own area of knowledge.

Content

1. Concept of function. The most usual functions. Polynomial functions and rational functions. The exponential function. The logarithm function. Trigonometric functions.

2. Notion and calculation of derivatives. The derivative as growth rate.

3. Integration. Applications of the integral.

4. Differential equations. Exponential growth and decline. Logistic growth.

5. Descriptive statistics. Descriptive study of a variable: mean, standard deviation, bar diagrams. Descriptive study of two variables: contingency and regression tables.

6. Fundamentals of probability. Independence and conditional probability. Bayes theorem.

7. Random variables and more frequent distributions. Hope and variance.

8. Introduction to statistical inference. Confidence intervals and hypothesis contrasts.

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Problems classes	11	0.44	3, 2, 5, 7, 4
Theory classes	31	1.24	3, 7, 4
Type: Supervised			
Computer practises	8	0.32	3, 2, 5, 7, 4
Type: Autonomous			
Personal study	57	2.28	3, 7, 4
Solving exercises	32	1.28	3, 2, 5, 7, 4

The teaching methodology includes three main types of activities (theoretical classes, problem classes and practicals in the computer room) and one complementary one (tutorials).

Theory classes: provide the student with the basic conceptual elements and information so that they can then develop independent learning. In addition to the essential theoretical body, illustrative examples will also be presented and the main applications in Genetics will be discussed.

Problem classes: in these classes, which will be held in smaller groups, selected exercises will be solved where theoretical knowledge will be put into practice, while critical reasoning will be encouraged. In class, only a representative selection of the proposed exercises can be solved; the others will be left for the students' independent or group work outside of class times.

Practice in the computer room: They will provide an introduction to several common computer tools for mathematical and statistical computation.

Tutoring: Individual or small group tutoring is planned, in order to solve questions that remain doubtful, at a time to be arranged.

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Assessment

Continous Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Partial exams	0,8	4	0.16	1, 9, 8, 3, 2, 5, 6, 7, 4
Recovery Exam	0,8	3	0.12	1, 9, 8, 3, 2, 5, 6, 7, 4
Submission of reports and/or practical questionnaries	0,2	4	0.16	1, 9, 8, 3, 2, 5, 6, 7, 4

The assessment is continuous and comprimes two parts, which are specified below along with their weight in the

• Written tests (80%). They will consist of two partial exams in correspondence with the two parts into which the subject is divided (topics 1-4 and topics 5-8). Both exams will count equally, provided you have obtained a minimum grade of 3.5 out of 10 in each of them. Otherwise, you will need to take the recovery exam specified below.

• Evaluation of practicals (20%): It will appraise the completion of computer practicals and the presentation of reports and/or exercises related to them. The deliveries will mostly take place at the end of the practical sessions.

The course will be considered passed if the student has taken the two partial exams, with a minimum grade of 3.5 in each of them, and the overall grade (80% the written tests and 20% the evaluation of the practices) is greater than or equal to 5.

If these conditions are not met, the student may take a recovery exam for the written tests.

If the evaluation activities carried out do not gather a weight greater than 50%, then the student will receive the qualification of "Not assessed".

This course does not provide for the single assessment system.

Use of the AI: In this subject it is not allowed the use of Artificial Intelligence (IA) in any of his phases. Any work including fragments generated by IA will be considered a lack of academic honesty and can lead to a partial or total penalty in the activity grade, or bigger sanctions in case of gravity.

Bibliography

- Jaume Aguadé, 2018. Matemàtiques i Modelització per a les Ciències Ambientals. (Autoedició)

- John Maynard Smith, 1968. Mathematical Ideas in Biology. Cambridge Univ Press.

- Xavier Bardina, Mercè Farré, 2005. Estadística : un curs introductori per a estudiants de ciències socials i humanes. (UAB, Col·lecció Materials)

- Rosario Delgado de la Torre, 2002. Apuntes de Probabilidad y Estadística (UAB, Col·lecció Materials)

- Newhauser, C. Matemáticas para Ciencias, Prentice Hall, Madrid

- Batschelet, E., Matemáticas básicas para biocientíficos, Dossat, Madrid

- Newby, J.C. Mathematics for the Biological Sciences, Clarendon Press

Software

The following software will be used: symbolic calculation software (Sage or WolframAlpha), grid calculation (Exce

Groups and Languages

Please note that this information is provisional until 30 November 2025. You can check it through this link. To consult the language you will need to enter the CODE of the subject.

Name	Group	Language	Semester	Turn
(PAUL) Classroom practices	611	Catalan	first semester	morning-mixed
(PAUL) Classroom practices	612	Catalan	first semester	morning-mixed
(PLAB) Practical laboratories	611	Catalan	first semester	morning-mixed
(PLAB) Practical laboratories	612	Catalan	first semester	morning-mixed
(PLAB) Practical laboratories	613	Catalan	first semester	morning-mixed
(TE) Theory	61	Catalan	first semester	morning-mixed