



UNIVERSIDAD DE CORDOBA

FACULTAD DE VETERINARIA  
**GRADO DE VETERINARIA**  
2024/25 YEAR  
**GENÉTICA**



## Course details

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**Course name:** GENÉTICA**Code:** 101453**Degree/Master:** GRADO DE VETERINARIA**Year:** 1**Field:** CIENCIAS BÁSICAS**Character:** BASICA**Duration:** SECOND TERM**ECTS Credits:** 6.0**Classroom hours:** 60**Face-to-face classroom percentage:** 40.0%**Study hours:** 90**Online platform:** <https://moodle.uco.es/>

## Coordinating teacher

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## Brief description of the contents

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The genetics course from the first year of the Veterinary Medicine degree encompasses Mendelian experiences, the extension of Mendelism, which contemplates several of the circumstances that modify the expected Mendelian proportions, such as non-dominance, co-dominance, multiallelism, lethality, genetics in relation to sex, epistasis, linked genes and chromosomal alterations, both numerical and structural. Likewise, the description of the distribution of alleles in population groups of individuals, and their changes over the course of generations, will be addressed (population genetics). Also, we will study how the basis of genetics lies in the structure of the genetic material, its expression, and how new technologies allow the large-scale study of genomes, identification of causes of disease, and treatment of diseases through the manipulation of nucleic acids in different organisms.

## Prerequisites

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### Prerequisites established in the study plan

None

### Recommendations

Prior knowledge about probability.

## Study programme

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### 1. Theory contents

#### - THEORY CONTENTS

Unit 1. Introduction to veterinary genetics. Genes and chromosomes. Genetic relevance of Mitosis and Meiosis.

Unit 2. Mendelian theories. Goodness-of-fit test. Autosomal and sex-linked traits. Analysis of genealogies.

Unit 3. Expansion of Mendelian analysis. Multiallelism, lethality, pleiotropy. Gene interactions without modification of the proportions.

Unit 4. Gene interactions with modification of the proportions. Epistasis.

Genetic determination of mammalian coat color. Penetrance and expressivity. Sex-influenced traits.

Unit 5. Linkage and recombination. Docking and repulsion. Cross-over (recombination).

Unit 6. Coincidence and interference coefficients. Genetic maps in domestic animals. Recombination maps.

Unit 7. Cytogenetics. The eukaryotic chromosome. Numerical chromosomal alterations of euploid and aneuploid type.

Unit 8. Structural chromosomal alterations. Karyotypes.

Unit 9. Molecular genetics. Expression of genetic information and its regulation.

Unit 10. Genomes. Structural and functional genomics. Transcriptomics, proteomics, and other "omics".

Unit 11. Mutation and genetic variation.

Unit 12. Construction and amplification of recombinant DNA molecules. Cloning of a specific gene. DNA fractionation by electrophoresis. DNA sequencing. Polymerase chain reaction (PCR). Restriction mapping. Eukaryotic gene expression in bacteria. Genetic engineering and biotechnology. Genetics in Veterinary Medicine: clinical applications.

Unit 13. Genetic variability in populations. Phenotypic, genotypic and gene (allelic) frequencies. Hardy-Weinberg equilibrium.

Unit 14. Concept of random cross-over. Inbreeding and associative mating. Kinship. Genealogies or path diagrams to calculate the inbreeding coefficient (F). Sources of variation and changes in gene frequencies. Variation from mutation. Variation from migration. Variation from drift.

Unit 15. Biological efficiency and the struggle for existence.

### 2. Practical contents

#### - PRACTICAL CONTENTS

Practical contents

Classroom practices: Resolution of problems and specific practical cases of each of the 15 units of the theoretical syllabus, which will have as objectives the consolidation and application of the knowledge acquired in the theoretical subjects. The classroom practice program is the same as the theory program, throughout the 15 weeks of the four-month period.

Laboratory practices:

- Mendelism.
- Cytogenetics. Study and observation of chromosomes.
- Analysis of genetic variation by PCR-RFLP.
- Genomics and bioinformatics.

## Bibliography

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### BASIC BIBLIOGRAPHY

- Griffiths et al. (2020). Introduction to Genetic Analysis. 12th edition. Macmillan international Ed.
- Pierce. (2020). Genetics. A Conceptual Approach. 7th Edition. Ed.: Macmillan international.
- Benito and Espino (2013). Genetics: essential concepts. Ed. Panamericana.
- Ménsua (2003). Genetics: problems and exercises solved. Pearson Ed.
- Tamarin. (1996). Principles of Genetics. Reverté, S.A.
- Nicholas. (1990). Veterinary Genetics. Ed. Acribia S.A.

## Methodology

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### General clarifications on the methodology (optional)

#### General clarifications on instruments for evaluation:

The grade (0 to 10 points) will result from the evaluation of the different parts of the course: The theoretical part (final exam): 70% (minimum 5/10 points), problem solving: 15% (tests every 3/4 units), and practice assistance and active participation, and reports/questionnaires: 15%. Grades from the laboratory practices over 5 points (passed) will be maintained for the present academic year and the following academic year. Grades from problem solving classes will only be maintained for the present academic year, in which the califications have been obtained.

### Methodological adaptations for part-time students and students with disabilities and special educational needs

#### Clarifications on the methodology for part-time students and students with disabilities and special educational needs:

The final grade will take into account the particular considerations of students who take the degree on a part-time basis, as well as for students with special needs.

### Face-to-face activities

Activity	Large group	Medium group	Small group	Total
<i>Information processing activities</i>	-	15	-	15
<i>Practical experimentation activities</i>	-	-	12	12
<i>Projects based on the course contents</i>	33	-	-	33
<b>Total hours:</b>	<b>33</b>	<b>15</b>	<b>12</b>	<b>60</b>

### Off-site activities

Activity	Total
<i>Exercise and problem solving activities</i>	90
<b>Total hours</b>	<b>90</b>

## Results of the training and learning process

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### Knowledge, competencies and skills

- CE3 Molecular bases of biological processes.
- CE4 Genetic bases in biological processes
- CE5 Theoretical principles in Genetic Biotechnology and Population Genetics

## Assessment methods and instruments

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Intended learning outcomes	Examination	Means of practical execution	Students assignments
CE3	X	X	X
CE4	X	X	X
CE5	X	X	X
<b>Total (100%)</b>	<b>70%</b>	<b>15%</b>	<b>15%</b>
<b>Minimum grade (*)</b>	<b>5</b>	<b>0</b>	<b>0</b>

(\*)Minimum mark (out of 10) needed for the assessment tool to be weighted in the course final mark. In any case, final mark must be 5,0 or higher to pass the course.

### General clarifications on instruments for evaluation:

#### General clarifications on instruments for evaluation:

The grade (0 to 10 points) will result from the evaluation of the different parts of the course: The theoretical part (final exam): 70% (minimum 5/10 points), problem solving: 15% (tests every 3/4 units), and practice assistance and active participation, and reports/questionnaires: 15%.

### Clarifications on the methodology for part-time students and students with disabilities and special educational needs:

#### Clarifications on the methodology for part-time students and students with disabilities and special educational needs:

The final grade will take into account the particular considerations of students who take the degree on a part-time basis, as well as for students with special needs.

### Clarifications on the evaluation of the extraordinary call and extra-ordinary call for completion studies:

#### Clarifications on the methodology for part-time students and students with disabilities and special educational needs:

The final grade will take into account the particular considerations of students who take the degree on a part-time basis, as well as for students with special needs.

**Qualifying criteria for obtaining honors:**

With a final grade equal to or higher than 9, and a maximum number of 5% of those enrolled in this course.

**Sustainable development goals**

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Unrelated

**Other Faculty**

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*The methodological strategies and the evaluation system contemplated in this Teaching Guide will respond to the principles of equality and non-discrimination and must be adapted according to the needs presented by students with disabilities and special educational needs in the cases that are required. Students must be informed of the risks and measures that affect them, especially those that may have serious or very serious consequences (article 6 of the Safety, Health and Welfare Policy; BOUCO 23-02-23).*

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