# 1. OVERVIEW

| | |
|---|---|
| **Subject** | Functional Genomics and Transcriptomics |
| **Subject Degree** | Bachelor's Degree in Biotechnology |
| **School/Faculty** | School of Biomedical and Health Sciences |
| **Year** | 3º |
| **ECTS** | 6 ECTS |
| **Character** | Compulsory |
| **Languages** | Spanish |
| **Mode** | On campus |
| **Semester** | S2 |
| **Academic Year** | 24-25 |
| **Coordinating professor** | Cira García de Durango |

# 2. INTRODUCTION

Functional Genomics and Transcriptomics is a compulsory subject (worth 6 ECTS) taught over three months in the third year of the Degree in Biotechnology. This subject belongs to the BIOCHEMISTRY AND MOLECULAR BIOLOGY module, and is worth a total of 33 ECTS.
The learning programme will provide students with knowledge of the functional use of genomics and transcriptomics so they can discover the location, properties and functions of genes and their transcripts, and the consequences of any alterations and/or modifications. The context is the function, from the gene to the phenotype. Economics is not exclusively focused on a gene, rather the complete genome, trying to discover and understand the intergenic regions for their application in different forms of expression of living beings and their biotechnological applications.

# 3. LEARNING OUTCOMES (RA, by the acronym in Spanish)

**Knowledge (CON, by the acronym in Spanish)**

**CON04**. Identify the techniques and principal methods of cell cultures, protein analysis from a biotechnology standpoint and genetic bases and their application in industry.
• Understand the organisation and function of the genome in the regulation of transcription, acquiring an integrated view of the control of gene expression.
• Understand the role of genomic variation in evolution and the usefulness of genome comparison in the study of human variability.
• Understand the main techniques and experimental strategies used in Genomics and Transcriptomics and their most common applications.
• Understand the importance of these disciplines in the fields of Biotechnology and Biomedicine and the impact they have had on the development of current science.

**Skills**

**COMP06**. Develop the skills needed to use the most common equipment, instruments and basic techniques in biotechnology, following quality standards and current biosecurity regulations.

**COMP09**. Identify and apply tools and techniques used in genetic and genomic engineering, both in experiments and in silico.

## 4. CONTENTS

The contents of the subject area are:

• Eukaryotic and prokaryotic genomes. Classification of species and molecular evolution.
• Comparison of genomes. Genomic maps.
• Human genomic variation. Population studies.
• Concepts and bases of gene expression. Regulation of gene expression in eukaryotes and prokaryotes. Epigenetics.
• Applied technologies in Genomics and Transcriptomics.

## 5. TEACHING/LEARNING METHODS

The types of teaching/learning methods are as follows:

- Lecture.
- Collaborative learning.
- Problem-based learning.
- Learning based on workshop teaching

## 6. LEARNING ACTIVITIES

The types of learning activities, plus the amount of time spent on each activity, are as follows:

| Learning activity | Number of hours |
|---|---|
| Lectures | 40 |
| Asynchronous master lectures | 12 |
| Case Studies | 4 |
| Problem-solving | 5 |
| Spoken presentations | 2 |
| Written reports and essays | 5 |
| Tutorials | 15 |
| Independent working | 50 |
| Workshops and/or lab work | 12 |
| On-campus knowledge tests | 5 |
| **TOTAL** | **150** |

# 7. ASSESSMENT

The assessment methods, together with how much they each count towards the final grade for the subject area, are as follows:

**On campus:**

| Assessment system | Weight (%) |
|---|---|
| On-site knowledge tests | 55 |
| Spoken presentations | 10 |
| Reports and written work | 10 |
| Case study/problem scenario | 10 |
| Laboratory practice | 15 |

On the Virtual Campus, when you open the subject area, you can see all the details of your assessment activities and the deadlines and assessment procedures for each activity.

## 7.1. Ordinary exam period

To pass the subject area in the ordinary exam period you must obtain a mark of 5.0 or more out of 10.0 in all assessed parts of the subject. Any part you do not pass in the ordinary exam period will need to be recovered in the extraordinary exam period (resits).

Your final grade will be the average of the partial marks in each of the learning activities you have passed.
The continuous assessment system for the learning activities requires attendance to at least 50% of the classes.

*It is compulsory for students studying degrees on-campus to accredit attendance to at least 50% of classes. This requirement qualifies students for the right to obtain academic counselling, support and monitoring from the professor. Failure to accredit attendance to at least 50% of the classes by any of the means proposed by the University will mean that the professor awarding a fail to the student for that subject area in the ordinary exam period in accordance with the grading system outlined in these regulations. All of the above, without prejudice to the other requirements or higher attendance percentages that other faculties may stipulate in their learning guides or internal regulations.* Regulations for the assessment of official degree programmes, Art. 1 point 4.

(*https://universidadeuropea.com/documents/1798/6. Reglamento_evaluacion_titulaciones_oficiales_grado_UEM_v2.pdf*)

## 7.2. Extraordinary exam period (resits)

To pass the subject area in the extraordinary exam period (resits), the students must obtain a mark equal to or above 5.0 out of 10.0 in all parts of the subject assessment they did not pass during the ordinary exam period.

The student must submit the activities not passed in the ordinary exam period taking into account the corrections or comments made by the teacher. The student must also submit any activities which were not submitted.

The final grade will be the average of the partial marks in each of the activities passed (with a mark equal to or higher than 5 out of 10). The marks for the assessable activities the student passed in the ordinary exam period will be maintained for calculating this grade.

# 8. TIMELINE

The timeline with delivery dates of assessable activities in the subject area is indicated in this section:

| Assessable activities | Date |
|---|---|
| Assessable activities | Dependent on learning progress |
| Objective test – first partial | Week 8-9 |
| Laboratory work | Week 6-9 |
| Objective test - Final | Week 18 |

The timeline may be subject to modifications for logistical reasons of the activities. Students will be informed of any changes in due time and course.

# 9. BIBLIOGRAPHY

The reference work for following this subject area is:


- Genes IX. Lewin B, Barrera Villa Zeballos H and Garcia Roig. 2008. ISBN 9789701066850.
- Genes X. Lewin B. Krebs JE, Goldstein ES, Kilpatrick ST. 2011. IBSN 9780763779924.
- Genomes 3. Brown TA. 2007. 3rd Edition. ISBN 0815341385.
- Introduction to genomics (2nd Edition). Lesk AM. 2012. ISBN 9780191665998.

- From genes to genomes concepts and applications of DNA technology (3rd edition). Dale J, von Schantz M, Plant M. 2012. ISBN 9781119953159.
- A primer of genome science. Gibson, Greg. 2009. ISBN 9780878932368
- Discovering genomics, proteomics and bioinformatics. Campbell, A. Malcolm. 2007. ISBN 0805382194.
- Genómica y proteómica. Francisco Javier Gallego Rodríguez y Ana Fernández Santander. 2019. ISBN: 978-84-9171-960-1

# 10. EDUCATIONAL GUIDANCE AND DIVERSITY UNIT

The Educational Guidance and Diversity Unit (ODI in Spanish) offers support throughout your time at university to help you with your academic achievement. Other cornerstones of our educational policy are the inclusion of students with special educational needs, universal access in all our university campuses and equal opportunities.

This ODI unit offers students:

1. Support and monitoring through counselling and personalised student plans for those who need to improve their academic performance.
2. Curricular adaptations to uphold diversity, with assistance for those students who require specific educational support, leading to equal opportunities without significant changes to methodology or evaluation.
3. We offer students a range of extracurricular educational resources to reinforce skills which will enhance their personal and professional development.
4. Career guidance by offering tools and advice to students with doubts regarding their professional careers or those who believe they have chosen the wrong line of study.

Students who need educational support can contact us at: orientacioneducativa@universidadeuropea.es

# 11. SATISFACTION SURVEYS

Your opinion matters!

Universidad Europea encourages you to complete our satisfaction surveys to identify strengths and areas for improvement for staff, degree courses and the learning process.

These surveys will be available in the surveys area of your virtual campus or by email.

Your opinion is essential to improve the quality of the course. Many thanks for taking part.