Biodiversity
Code: 100931
ECTS Credits: 6

<table>
<thead>
<tr>
<th>Degree</th>
<th>Type</th>
<th>Year</th>
<th>Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>2500253 Biotechnology</td>
<td>OT</td>
<td>4</td>
<td>0</td>
</tr>
</tbody>
</table>

Contact

Name: Miquel Riba Rovira
Email: Miquel.Riba@uab.cat

Use of languages

Principal working language: catalan (cat)
Some groups entirely in English: No
Some groups entirely in Catalan: Yes
Some groups entirely in Spanish: No

Teachers

Francesc Muñoz Muñoz
Javier Lopez Alvarado

Prerequisites

- Basic knowledge on plant and animal morphology and systematics
- Basic concepts on population genetics
- Basic knowledge about methods for statistical inference.

Objectives and Contextualisation

Biotechnological development is mainly based on the use of a great variety of biological entities, forms and processes, collectively known as "Biodiversity". The "ultimate" causes explaining the origin and maintenance of such overwhelming diversity are deeply grounded on the evolutionary processes. Evolutionary facts and processes will be analyzed at different biological scales, from molecules to ecosystems, and from changes taking place within populations during several generations to patterns observed over the millennia. One of the first principles of the Theory of Evolution is the one about diversification from a common ancestor, meaning the existence of genealogical relationships between organisms. In that sense, one of the main goals of the course is the study of genealogic/phylogenetic relationships between organisms and how these relations are built from basic evolutionary principles.

The main objectives of the course are:

1) To widen the understanding of the causes, processes and consequences of Evolution.
   1. Recognize the main evolutionary trends during diversification of biota throughout the history of life in our planet.
   2. Understand the main evolutionary mechanisms and how they interact with ecological processes.

2) To provide the basic conceptual and methodological tools needed to analyze evolutionary processes using the scientific method by:
1. Incorporating the dynamic view of evolutionary changes into the study and characterization of natural and anthropogenic systems.
2. Understanding and establishing evolutionary relationships between organisms at every taxonomic level using the basic bioinformatics techniques.
3. Enhancing the skills to develop a scientific perspective when facing complex problems and phenomena.

3) To reflect and develop a critical view on the social consequences and impact of the use of Biodiversity in the light of the Evolutionary Theory.

Skills

- Adopt clear, objective scientific criteria in order to project a positive, transparent image of biotechnology to economic, political and social agents.
- Interpret experimental results and identify consistent and inconsistent elements.
- Learn new knowledge and techniques autonomously.
- Make an oral, written and visual presentation of ones work to a professional or non-professional audience in English or in one's own language.
- Read specialised texts both in English and ones own language.
- Reason in a critical manner
- Search for and manage information from various sources.
- Think in an integrated manner and approach problems from different perspectives.
- Work individually and in teams

Learning outcomes

1. Build up a global vision of the importance of the evolutionary and ecological processes that give rise to living organisms.
2. Critically and objectively evaluate the impacts of biotechnological advances on nature, society and political life.
3. Interpret experimental results and identify consistent and inconsistent elements.
4. Learn new knowledge and techniques autonomously.
5. Make an oral, written and visual presentation of ones work to a professional or non-professional audience in English or in one's own language.
6. Read specialised texts both in English and ones own language.
7. Reason in a critical manner
8. Recognise the importance of biology-related organisations in the regulation of services that are essential to human health and the environment.
9. Recognise the need to preserve the biological processes that contribute to the generation and use of living organisms.
10. Search for and manage information from various sources.
11. Think in an integrated manner and approach problems from different perspectives.
12. Work individually and in teams

Content

PART-I. Microevolution: evolutionary processes in populations and species.

1. Introduction to Evolutionary Biology: fundamental principles.
2. Genetic variability: types and applications of molecular markers.


**PART-II. Macroevolution and the history of life**

1. The origin of life and precambrian evolution. The tree of life.

**Methodology**

1) Theoretical lectures: 39 h. in-class attendance

2) Seminars, discussions and student directed learning: 4 h. in-class attendance.

3) Practical learning in computer lab: 7 h. lab attendance.

4) Personal work and study: 80 h.

5) Preparing and writing of group work and personal assignment: 12 h

6) Exams and evaluation: 8 h

**Activities**

<table>
<thead>
<tr>
<th>Title</th>
<th>Hours</th>
<th>ECTS</th>
<th>Learning outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type: Directed</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Computer Lab</td>
<td>7</td>
<td>0.28</td>
<td>3, 1, 11, 7</td>
</tr>
<tr>
<td>In-Class Theoretical Lectures</td>
<td>4</td>
<td>0.16</td>
<td>5, 3, 6, 11, 7, 12</td>
</tr>
<tr>
<td>Seminars and In-class Individual and Group Activities</td>
<td>39</td>
<td>1.56</td>
<td>9, 2, 1, 11, 7, 8</td>
</tr>
<tr>
<td><strong>Type: Supervised</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data Analyses and Writting Activities</td>
<td>12</td>
<td>0.48</td>
<td>11, 7, 12</td>
</tr>
<tr>
<td><strong>Type: Autonomous</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Individual assignements and study</td>
<td>80</td>
<td>3.2</td>
<td>4, 9, 2, 3, 6, 1</td>
</tr>
</tbody>
</table>

**Evaluation**

The evaluation system is organized into 2 units:

1) UNIT-1. Theory. Tests and written exams on theoretical lectures: 50% of the final mark. This unit will be made of two independent exams:
1.1. Part. I. Microevolution: evolutionary processes in populations and species: 50% unit's mark (25% final mark)

1.2. Part. II. Macroevolution and the history of life: 50% unit's mark (25% final mark).

2) UNIT-2. Practical work, seminars, personal and group assignments: 50% of the final mark:

2.1. Individual exam on the practical work of the evolutionary analysis of morphological variation: 30 % of the unit's mark (15% final mark).

2.2. Individual exam of activities in the computer lab about methods of phylogenetic inference: 70 % of the unit's mark (35% final mark).

* Students have the right to have a reatke of all evaluation activities.

* To be eligible for the retake process, the student should have been previously evaluated in a set of activities equaling at least two thirds of the final score of the course or module. Thus, the student will be graded as "No Avaluable" if the weighthin of all conducted evaluation activities is less than 67% of the final score.

* Dates and time schedules for exams and evaluaiton assessments will be indicated in the calendar provided by the degree coordinator or by the teaching staff.

* Passing a midterm exam of UNIT-1 implies full achievement of its content, skills and competences and do not need to be re-assessed in the final second-chance examination.

* To pass the course the student must get at least 5/10 in UNIT-1. Exams with marks lower than 4/10 will not be used in this calculation.

* The students that successfully pass the theoretical unit (UNIT-1) also have the right accessing the second-chance reassessment exam so as to improve their mark in this unit. In this case, the final mark for this unit will be the one attained in this reassessment examination.

### Evaluation activities

<table>
<thead>
<tr>
<th>Title</th>
<th>Weighting</th>
<th>Hours</th>
<th>ECTS</th>
<th>Learning outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practical work, seminars, personal and group assignments</td>
<td>50</td>
<td>4</td>
<td>0.16</td>
<td>4, 3, 7, 12</td>
</tr>
<tr>
<td>Written exams and tests on theoretical lectures</td>
<td>50</td>
<td>4</td>
<td>0.16</td>
<td>9, 2, 10, 5, 6, 1, 11, 7, 8</td>
</tr>
</tbody>
</table>

### Bibliography

**BASIC TEXTS:**


INTERNET RESOURCES:

http://tolweb.org
http://life.bio.sunysb.edu/morph/
http://1kai.dokkyomed.ac.jp/mammal/en/mammal.html
http://www.nature.com/scitable