# COURSE DATA

## DATA SUBJECT

**Code:** 33043
**Name:** Basic tools in biology
**Cycle:** Undergraduate Studies
**ECTS Credits:** 6
**Academic year:** 2025-26

## STUDY (S)

| Degree | Center | Acad. year | Period |
|---|---|---|---|
| 1106 - Degree in Biology | Facultat de Ciències Biològiques | 1 | Annual |

## SUBJECT-MATTER

| Degree | Subject-matter | Character |
|---|---|---|
| 1106 - Degree in Biology | Biología | BASIC |

## COORDINATION

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# SUMMARY

The subject **"Basic Tools in Biology"** is a compulsory subject of the first year of the Degree in Biology. It is part of the Basic Training and Biology Module, which consists of 36 ECTS credits and covers a wide range of contents, both conceptual and instrumental that aim to introduce the student to the science he or she has decided to study throughout the degree. The subject of 6 ECTS credits is aimed at the development and achievement of certain transversal competences such as the management of information and communication technologies (ICTs), the preparation, publication and presentation of scientific documents. It is also intended to provide students with basic knowledge in research, handling of instruments and safety in the laboratory and the field. In parallel with the development of these skills, scientific English will be used as a fundamental language in science.

# PREVIOUS KNOWLEDGE

## RELATIONSHIP TO OTHER SUBJECTS OF THE SAME DEGREE

There are no specified enrollment restrictions with other subjects of the curriculum.

## OTHER REQUIREMENTS

There are no specified enrollment restrictions with other subjects of the curriculum.

## COMPETENCES / LEARNING OUTCOMES

### 1106 - Degree in Biology

Assimilate the process of constructing scientific knowledge: experimentation in the laboratory and field studies, gathering, handling and analysis of data and preparation of scientific documents. Use of information and communication technology (ICT) in biology.

Be able to analyse the data obtained in different biological experiments by using appropriate statistical software.

Design and conduct experiments by using scientific techniques and instruments appropriately and complying with laboratory safety regulations.

Interpret, analyse, evaluate, process and synthesise biological data and information by applying mathematical and statistical methods.

Organise, plan and manage information in a manner that allows the individual to analyse, synthesise and develop critical reasoning that can be applied to solve problems, make decisions and carry out work.

Students must be able to apply their knowledge to their work or vocation in a professional manner and have acquired the competences required for the preparation and defence of arguments and for problem solving in their field of study.

Students must be able to communicate information, ideas, problems and solutions to both expert and lay audiences.

Students must have the ability to gather and interpret relevant data (usually in their field of study) to make judgements that take relevant social, scientific or ethical issues into consideration.

Use ICTs, apps and other computer tools to manage and disseminate information in both educational and professional environments.

Use scientific language, both oral and written, and be able to adapt the register to the target audience and/or readers. Use the most common foreign languages in each discipline as a vehicle for communication in a globalised system.

## DESCRIPTION OF CONTENTS

### 1. INFORMATION AND COMUNICATION TECHNOLOGIES (THEORY)

### 1. THE JOURNAL ARTICLE.

1.1. Structure of the article: IMRAD/IMRAD/IMRYD format.
1.2. Before starting: the choice of journal.
1.3. Instructions to authors (authors guidelines).
  1.3.1. First page or title page.
  1.3.2. The introduction.
  1.3.3. Materials and methods.
  1.3.4. Results.
  1.3.5. Discussion.
  1.3.6. Acknowledgements.
  1.3.7. Bibliography.

**2. QUALITY AND RELIABILITY OF INFORMATION.**
2.1. Sources of information in the classroom. Notes.
2.2. Basic bibliography as a source of information in the classroom.
2.3. Sources of information consulted on the Internet.
2.4. The impact of information on the training of students: the use of scientific language.

**3. SCIENTIFIC COMMUNICATION.**
3.1. Publishers and Scientific Societies as journal managers.
3.2. Scientific knowledge requires publicity, dissemination and contrast.
3.3. Many formal aspects determine the acceptance or rejection of the work.
3.4. Types of documents in scientific communication.
  3.4.1. Primary documents.
  3.4.2. Secondary documents.
  3.4.3. Reference literature.

**4. OTHER DOCUMENTS**
4.1. Panels or posters.
4.2. Written and oral presentation of seminars.
4.3. Reports and projects in biology.
4.4. The doctoral thesis.

**5. EDITORIAL PROCESS FOR THE REVISION OF THE ARTICLE.**
5.1. Evaluation of the quality of the journal: Impact Factor.

**6. RELIABILITY OF INFORMATION AND SCIENTIFIC FRAUD.**
6.1. The use we make of information on the Internet. Respect for authorship.
6.2. Reliability and fraud.
6.3. Predatory journals.

**2. PRACTICAL SESSIONS IN COMPUTER CLASSROOM**

Session 1: Search Strategies. Managing Bibliographic Databases. MEDLINE and WEB of SCIENCE.
Session 2 and 3: Bibliographic Managers. Introduction to Mendeley and RefWorks

## 3. EXERCISES IN CLASSROOM SESSIONS

01.- Reading, viewing, debate and summary of dissemination works.
02.- Oral presentation based on dissemination works from different sources. Practical exercise.
03.- How to prepare a scientific article? Comments and discussion of examples.

## 4. PRACTICE SESSION IN BIOLOGY LABORATORY

1. Obtaining quantitative data of macroscopic pieces
2. Observation of biological specimens through the binocular microscope and microscope. Calculation of simple measurements.
3. Observation and differentiation of microbial types through the appearance of colonies grown on Petri dishes.
4. Animal experimentation in the laboratory.

## 5. FIELD RESEARCH IN BIOLOGY (CLASSROOM THEORY SESSIONS)

Session 1. Basic concepts of working in the field. Basics. Work and field study: phases and scales of study. Regulations and good safety practices in the field.

Session 2. Use of cartography and geographic positioning systems. Importance of cartography and geolocation. Spatial location of the field study and use of cartography. The Earth and its representation on the plane. Coordinate systems. Positioning systems.

Session 3. Sampling methodologies. Variables and values. Notion of sampling. Sampling designs. Quantitative variables.

Session 4. Main sampling techniques. Order. Sampling techniques for calculating densities: point, line, area and volume. Individuals reactive to sampling. Relative densities. Quasi-continuous local measurements and remote data collection.

## 6. RESEARCH OF FIELD IN BIOLOGY (theory in classroom)

Session 1. Introduction to the Practical Unit. Presentation of practices for field data collection and analysis. Logistical aspects.

Sessions 2 and 3. Field trips.

* Albufera Natural Park.
* Turia Natural Park.

Objectives:
- Know the methodology and basic instruments for the collection and registration of different

environmental parameters, as well as for the collection and conservation of biotic and abiotic samples.
- Apply census methods (direct and indirect) to count mobile and sessile organisms.
- Apply methods for capturing organisms.
- Take and record biometric data from organisms in the field.

Sessions 4 and 5: Laboratory practices

Objectives: To know the specific material of work in the laboratory. Treatment of biological material and samples preserved in the field.

Session 6: Practice in Computer Room.

Objectives: To know and use different computer applications to organize and analyze the data obtained in the field.

## WORKLOAD

### PRESENCIAL ACTIVITIES

| Activity | Hours |
|---|---|
| Tutorials | 3,00 |
| Theory | 19,00 |
| Laboratory | 24,00 |
| Computer classroom practice | 8,00 |
| Classroom practices | 6,00 |
| **Total hours** | **60,00** |

### NON PRESENCIAL ACTIVITIES

| Activity | Hours |
|---|---|
| Attendance at other activities | 0,00 |
| Individual or group project | 25,00 |
| Independent study and work | 0,00 |
| Preparation of lessons | 23,00 |
| Preparation for assessment activities | 42,00 |
| Resolution of case studies | 0,00 |
| **Total hours** | **90,00** |

## TEACHING METHODOLOGY

**Blocks 1 to 4. Information and Communication Technologies and Laboratory in Biology**

This part is structured in face-to-face activities (theoretical classroom sessions, computer classroom practices and problem sessions) and in non-presential activities of autonomous work of the students.

Theoretical sessions in the classroom (Groups of 64 students). They will be developed during 15 sessions of 1 hour, which will be taught sequentially, so that they are integrated with the rest of the proposed activities. The objective is to introduce the fundamental concepts necessary for the search, presentation and publication of scientific results, using ICTs as a fundamental tool.

Practice sessions in computer room (Groups of 32 students). There will be 3 sessions of 2 hours in the computer room. The main objective is for students to apply the knowledge acquired in the search and management of information in databases and scientific managers. In addition, they will start publishing scientific results.

Classroom exercise sessions (Groups of 32 students). There will be 6 classroom sessions of 1 hour. The objective of these sessions is, through the approach of different activities, to work on the different aspects necessary to present and publish scientific results in different formats.

**BLOCKS 5 AND 6.- FIELD RESEARCH IN BIOLOGY.**

Theoretical sessions in the classroom (Groups of 64 students). They will be held in 4 sessions of 1 hour.

Practical unity. Sequentially, they are composed of the following sessions:

- *Group tutoring*: Single session in groups of 16 people guided by a teacher.
- *Field* trips: Two field trips of 6 hours each. Work in groups of 16 people guided by a teacher.
- *Laboratory practices*. Two laboratory sessions of 2 hours each. Associated with the corresponding field trips, two laboratory practices will be carried out using the materials collected in the field.
- *Computer Room Practice*. Single session of 2 hours. Associated with field and laboratory practices, they aim at the quantitative analysis of the data collected.

## EVALUATION

The following distribution is proposed over a maximum of 100 points (50 POINTS MUST BE ACHIEVED TO PASS THE SUBJECT):

**EVALUATION QUESTIONNAIRES IN VIRTUAL CLASSROOM (UP TO 40 POINTS)**

Face-to-face questionnaires will be carried out in the Computer Room through the Virtual Classroom where test questions will be collected from all parts of the subject. It is a necessary condition to pass these questionnaires in order to pass the subject. In the case of being able to compensate the grade with that obtained in the activities, it can be done from 20 points. The grade obtained in this block will be saved for a

full academic year.

**EVALUATION OF ACTIVITIES (UP TO 60 POINTS)**

In this section, all the activities that students must carry out, both face-to-face and non-face-to-face, will be assessed. In case of not passing the subject in the first call, the activities passed will be saved until the next call.

All these activities must be carried out during the period of the academic year between September and June. If they are not done in this period, the subject cannot be passed.

- Preparation of article disclosure(1) **15 points**
- Literature search(2) **5 points**
- Activities Problem classes **10 points**
- Transversal activity (Biodegree) **10 points**
- Laboratory practice exercises in biology **5 points**
- Practical Unit of Field Research in Biology(3) **15 points**

(1) Preparation of a dissemination article. In this activity students will be able to choose between 5 and 10 references from those found in their bibliographic searches and by reading the summaries elaborate a small article of dissemination on the subject, following the structure explained in the theory classes. Data or results from any other part of the same subject may also be used.

(2) Bibliographic search. In this activity and on a topic proposed to students, a bibliographic search will be carried out in different databases and stored in a bibliographic manager (REFWORKS and / or MENDELEY). Once the non-relevant information has been reviewed and eliminated, students will create a document, based on the bibliographic style proposed in the practices and upload it to the Virtual Classroom for evaluation. This document must contain at least 25 bibliographic references directly related to the proposed topic.

(3) Practical Unit of Field Research in Biology (Field trips and data analysis in laboratory and computer room). *This unit is considered mandatory*. It will assess the attitude, knowledge and attendance at each of the activities, as follows:

- *Delivery of practice sheets*: Up to 10 points (obtained from the average, out of 10, of the evaluation of each practice).
- *Attendance*: Up to 5 points, weighted on the time dedication to each session.

To be evaluated in the Practical Unit of the Field Research part in Biology it is necessary to attend at least 80% of the programmed activities.

## REFERENCES

Sutherland W. J. (ed). 1996. Ecological census techniques. Cambridge University Press. (unidad temática parte 4)