

**COURSE DATA****Data Subject**

Code	33043
Name	Basic tools in biology
Cycle	Grade
ECTS Credits	6.0
Academic year	2022 - 2023

Study (s)

Degree	Center	Acad. Period year
1100 - Degree in Biology	Faculty of Biological Sciences	1 Annual

Subject-matter

Degree	Subject-matter	Character
1100 - Degree in Biology	5 - Biology	Basic Training

Coordination

Name	Department
RAMO ROMERO, JOSE JUAN DEL	23 - Functional Biology and Physical Anthropology

SUMMARY

The subject "**Basic Biology Tools**" is a compulsory subject from first year of the degree of biology. It is part of the basic set of subjects called "**Biology**". The set of subjects consists of 30 ECTS credits and covers a wide range of content, both conceptual and instrumental intended to introduce students to science has decided to study throughout the degree. The subject of 6 ECTS credits is aimed at the development and achievement of certain transversal competences as the management of the technologies of information and communication, the preparation, publication and presentation of scientific papers. In parallel with the development of these competencies will handle scientific English, as a key language in science. It also aims to give students basic knowledge in the handling of animals, experimentation, instrumentation management, legislation and safety in the laboratory. This basic training with notions of field research will finally be completed.



PREVIOUS KNOWLEDGE

Relationship to other subjects of the same degree

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

Other requirements

COMPETENCES (RD 1393/2007) // LEARNING OUTCOMES (RD 822/2021)

1100 - Degree in Biology

- Situar la Biología en el contexto de la ciencia a través del conocimiento de algunos de sus grandes temas y problemáticas en el mundo actual.
- Manejo de material para la experimentación en el laboratorio y en el campo.
- Conocer las normas de seguridad e higiene en el laboratorio.
- Manejo de recursos informáticos de utilidad en Biología.
- Conocer la legislación básica de la profesión del biólogo/a.
- Capacidad de análisis, síntesis, trabajo metódico y riguroso.
- Capacidad de análisis crítico de textos científicos.
- Manejo del inglés científico.
- Develop the capacity for organisation and planning.
- Capacidad de presentación escrita y oral de datos científicos.
- Capacidad de divulgación del conocimiento científico.
- Habilidad para el trabajo en equipo.
- Conocimiento y respeto de la diversidad cultural humana.
- Capacidad de valoración de los riesgos medioambientales y de las crisis de biodiversidad.
- Compromiso con la conservación y con el desarrollo sostenible.
- Compromiso con la defensa y práctica de las políticas de igualdad.
- Compromiso ético en el manejo de animales para experimentación.
- Compromiso ético en el ejercicio de la profesión de biólogo/a.
- Identificar relaciones entre la ciencia y la sociedad.
- Analizar los valores culturales implícitos en los saberes y prácticas de la ciencia.
- Asimilar la dimensión histórica del conocimiento.
- Asimilar el proceso de construcción del conocimiento científico.



- Analizar dilemas éticos derivados de la aplicación de la tecnología y de su uso social.
- Capacidad para divulgar la ciencia.

LEARNING OUTCOMES (RD 1393/2007) // NO CONTENT (RD 822/2021)

- Develop synopsis and criticism from the reading and comprehension of science texts.
- Capacity for speaking to an auditorium audience, for example the class itself, through the exhibition or the speech in a debate on an issue or controversial issue.
- Know the basic scientific instrumentation of the biology laboratory management.
- Know the law on the work in the laboratory and in the field and handling of animals regulations.
- Acquire skill enough in the handling of laboratory animals.
- Know the basic material of field and the general concepts about making data and sampling.
- Ability to work in group when dealing with problematic situations on a collective basis.
- Ability to argue from rational criteria, clearly differentiating what is opinion of what facts or accepted scientific evidence.

DESCRIPTION OF CONTENTS

1. INFORMATION AND COMMUNICATION TECHNOLOGIES

1. QUALITY AND RELIABILITY OF INFORMATION.
 - 1.1. Sources of information in the classroom. Annotations
 - 1.2. The basic bibliography as a source of classroom information.
 - 1.3. Sources of information consulted on the Internet.
 - 1.4. The impact of information on the training of students: the use of scientific language.
2. SCIENTIFIC COMMUNICATION
 - 2.1. Publishers and Scientific Societies as journal publishers.
 - 2.2. Scientific knowledge requires publicity, dissemination and contrast.
 - 2.3. Many formal aspects determine the acceptance or rejection of the work.
 - 2.4. Tipus de documents en la comunicació científica.
 - 2.4.1. Primary Documents.
 - 2.4.2. Secondary documents.
 - 2.4.3. Reference literature.
3. THE JOURNAL ARTICLE
 - 3.1. Structure of the article: IMRAD/IMRAD format.
 - 3.2. Before starting: the choice of the journal
 - 3.3. Instructions to authors (authors guidelines)
 - 3.3.1. First page or title page.
 - 3.3.2. Introduction



- 3.3.3. Materials and methods.
- 3.3.4. Results.
- 3.3.5. Discussion.
- 3.3.6. Acknowledgements.
- 3.3.7. Bibliography
- 3.4. Editorial process for the revision of the article.
- 3.5. Assessment of the quality of the journal: Impact Factor.
- 4. OTHER DOCUMENTS
 - 4.1. Panels or posters.
 - 4.2. Elaboration and written and oral presentation of seminars.
 - 4.3. Reports and projects in biology.
 - 4.4. Doctoral thesis
 - 4.5. The curriculum
- 5. RELIABILITY OF INFORMATION AND SCIENTIFIC FRAUD.
 - 5.1. The use we make of Internet information. Respect for authorship.
 - 5.2. Reliabilitat i frau.
 - 5.3. Predatory *journals.

2. PRACTICAL SESSIONS IN COMPUTER CLASSROOM

Session 01.- *Search strategies. Maneig de Bases de dades Bibliogràfiques. MEDLINE and WEB of SCIENCE.

Session 02 and 03.- Gestors Bibliogràfics. *Introduction to the management of MENDELEY and REFWORKS.

3. EXERCISES IN CLASSROOM SESSIONS

- 01.- Reading, viewing, debate and summary of dissemination works
- 02.- Oral presentation based on dissemination works.
- 03.- Preparation of a scientific article in a group.

4. PRACTICE SESSION IN BIOLOGY LABORATORY

- 01 Obtaining quantitative data of macroscopic pieces
- 02. Observation of biological specimens through the binocular microscope and microscope. Calculation of simple measurements.
- 03 Observation and differentiation of microbial types through the appearance of colonies grown on Petri dishes.
- 04. Handling of animals in the laboratory.



5. MANAGEMENT OF ANIMALS IN EXPERIMENTATION (theory in classroom)

This part of the subject tries to introduce the student to the basic notions of both the handling of laboratory animals and the national and international legislation on animal experimentation.

Theoretical sessions in the classroom (Groups of 64 students). They take place in 2 sessions of 1 hour.

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

Session 1. Introduction. Basic concepts of work in the field. Legislation for field work: Earth and water environment. Setting manipulation of living organisms in the field. Security in field work. Aspects to be taken into account in the planning and design of a work in the field.

Session 2. Use of cartography and geographical positioning (GPS) systems. Basic material of field. Management and conservation of the material in the field

Session 3. Basic concepts about data gathering. Taking of physico-chemical data. Taken from biological data in plants. Taken from biological data in animals. Use of the basic material for making data.

Session 4. General methods of sampling. Census: General concepts and sampling design. Census methods. Methods of trapping. Methods of marking and tracking. Use of the basic material of sampling.

7. RESEARCH OF FIELD IN BIOLOGY (DATA COLLECTION AND ANALYSIS)

* DATA COLLECTION:

- Field trips:

* The Albufera natural park

* The Turia Natural park

Objectives:

- Basic Methodology and instrumentation for registration of different environmental parameters and for recording and conservation of biotic and abiotic samples.

-Implement some method of census (direct and indirect) for mobile and sessile organisms.

-Implement a method for the capture of organisms. Registration of biometric data of the organisms in the field. Registration of data on the biology of the organisms. Apply some organisms marking technique.

* DATA ANALYSIS:

* Laboratory practice

Objectives: Know the specific material in the laboratory work. Treatment of living material. Treatment of samples in the field. Preservation of samples obtained in the field

* Practice in computer classroom.

Objectives: Design of data collection. Know and use different computer applications to organize data in the field.



8. INTERDISCIPLINARY SEMINARS

Intends to produce "Interdisciplinary seminars" in group (3/4 students), with the rest of the subjects that comprise the course. The teachers of these subjects would intervene mainly in the tutoring of the contents, while the teachers of Basic Biological Tools subject would occupy the presentation of such content. The result of these interdisciplinary seminars are intended to be in the form of "Panels".

WORKLOAD

ACTIVITY	Hours	% To be attended
Laboratory practices	24,00	100
Theory classes	19,00	100
Computer classroom practice	8,00	100
Classroom practices	6,00	100
Tutorials	3,00	100
Development of group work	23,00	0
Development of individual work	1,00	0
Readings supplementary material	1,00	0
Preparation of evaluation activities	42,00	0
Preparing lectures	11,00	0
Preparation of practical classes and problem	12,00	0
TOTAL	150,00	

TEACHING METHODOLOGY

PART 1.-INFORMATION AND COMMUNICATION TECHNOLOGIES

This part is structured in classroom activities (theory sessions in classroom, computer sessions and classroom problems) and not face-to-face activities of independent work of students.

- *Theoretical sessions in classroom (64 students)*. Will take place during 4 sessions of 1 hour, which will be taught sequentially, of form that will be integrated with the rest of proposed activities.
- *Practical Sessions in computer classroom (groups of 32 students)*. Carried out 3 sessions of 2 hours in classroom computing

o *Practice 1*-Introduction of basic concepts needed to develop search strategies. Then and totally practical way to train students in the basic operation of two major databases: MEDLINE and Web of Science. As a result of the practice, the student will receive search saves for further treatment.



o *Practice 2 and 3* -Introduction to MENDELEY and REFWORKS. This software allows storage of references "on line" and its subsequent treatment for use in publications. The basic operation of the various options it offers, with special emphasis on the import of results from databases such as those used in the first session will be introduced.

- *Exercices in classroom (groups of 32 students)*. 6 Sessions be held in 1-hour classroom. The goal of these sessions is through the approach of various activities, work different aspects needed to present scientific results in various formats.

o *Session 1 and 2. Reading, viewing, discussion and summary of disclosure documents*. Groups will form in this activity and you will provide specific documentation on a subject. Students must read, understand and interpret this documentation and through the working group to reach a script or outline of the read. Continuation and individually each students to, in your own words should develop a summary (maximum a folio). To end the activity of a small number of students elected by lot read aloud his summary.

o *Session 3 and 4.- Debate and oral presentation*. It will take advantage of the documentation of the first 2 sessions, obtained from sources of different quality and reliability, to prepare an oral presentation group. A representative of each group, carried out a presentation of about 10 minutes, defending his views. This activity will be taken to show the practical aspects that can affect the efficacy of an oral presentation.

o *Session, 5 and 6.- Exercises on publications*. In these sessions, and using what has already been studied in the theoretical classes and bibliographic searches, a scientific article will be prepared. Special care will be taken in the structure and preparation of the bibliography.

PART 2.- LABORATORY IN BIOLOGY.

This part of the course is to introduce students, in a practical way, to the recognition and management of basic instruments in the laboratory of biology.

- *Lab sessions (Groups of 16 students)*. Will be held 4 sessions of 2 hours duration

o *Practice 1.-* This practice is showed to the student how to *obtain quantitative data of macroscopic pieces that can grab with his hands and that is not possible to grab and parts that require the help of magnifying glass or use of photographic images*. Core to determine measures are: length, area, weight and volume.

o *Practice 2.- Tools for the observation of biological samples*. Teach the practical way to proceed with the adjustment of the lighting on the microscope to optimize vision with the device. It will teach you how to determine the magnification of the objetivo-ocular pair and its application to the calculation of simple measures taken with a microscope. The biological material used for these operations are imprints of liver, blood cells of chicken and "squash" of meristem of seeds germinated.

o *Practice 3-Observations* will be made to learn to *differentiate microbial types through the appearance of colonies*: shape, size, color, refringencia, etc. Observations in the optical microscope of the different colonies present were also conducted to know its corresponding cell morphologies by observation in fresh and stained.



o *Practice 4.*- The objective of this practice session is to show students the guidelines for the *handling of some animals for use in laboratories of biology*. Carried out activities relating to the handling of the mouse, transport, weighed and measures some parameters. It will show how to determine the sex of the animals. Other animals that will be used in this practice is a type of fish; some authorised anaesthetics to study the response of the animals, manipulate them and obtain various measures shall be tested with them.

PART 3.- HANDLING OF ANIMALS FOR EXPERIMENTATION.

This part of the course is to introduce to the students in the basics of both national and international legislation in the handling of laboratory animals in animal experimentation.

- *Theoretical sessions in classroom (64 students groups)*. Be carried out in 3 sessions of 1 hour.

PART 4.- RESEARCH FIELD IN BIOLOGY.

- *Theoretical sessions in classroom (64 students groups)*. They carried out in 4 sessions of 1 hour.

o Field trip. Two 6-hour field trips or one full-day trip to the following places:

- L'Albufera Natural Park. Work in groups of 16 people guided by a teacher, in periods of approximately two hours. Studies in the terrestrial environment (dunes, pine forest) and aquatic environment (lagoon, malladas).

- Turia Natural Park. Work in groups of 16 people guided by a teacher, in periods of approximately two hours. Studies in the terrestrial environment (river bank, cultivated area) and aquatic environment (river).

o Practices laboratory. Two sessions of 2 hours laboratory each one.

Associated to the corresponding field trips will be two laboratory practice using the materials collected in the field.

o Computer classroom practice. A session of 2 hours.

Know and use different computer applications to organize data in the field.

In necessary to assist 3 blocks of "record and analysis of data" to be able to score in this section.

EVALUATION

Proposed the following pattern on **a maximum of 100 points**

(Is necessary reach 50 points to pass the subject):

**- QUESTIONNAIRES FOR EVALUATION IN “AULA VIRTUAL” (UP TO 50 POINTS)**

Face-to-face classroom computer questionnaires is carried out through “Aula Virtual” where all parts of the subject will be collected in test questions. Approve these questionnaires to be able to pass the course is a prerequisite. In the case of to offset the note obtained in activities, it may be from *20 points*. The qualification obtained in this block will be saved until the call for July 2013.

- EVALUATION OF ACTIVITIES (UP TO 50 POINTS)

All the activities that should be done both on-site and remote by students will be evaluated in this section. If you do not pass the subject in the first round will be saved activities exceeded up to the second call.

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

Drafting basic scientific article ⁽¹⁾ **15 points**

Bibliographic search ⁽²⁾ **5 points**

Activity classes of problems **10 points**

Interdisciplinary seminars (panels presentation) **10 points**

Exercises of practices of laboratory and field **10 points**

Participation in inter-subjets activities (extra points) **5 points**

TOTAL 55 points

(1) Drafting basic scientific article. In this activity students can choose between 5 or 10 references found in the literature search and by reading the summaries make a small article on the subject, following the structure explained in theory classes. Can also be data or results of any other part of the same subject.

(2) Bibliographic search. In this activity and on a subject proposed to the students is will carry out a literature search in different databases and store it in REFWORKS. Once reviewed and eliminated the non relevant information, students will create a document based on the proposed bibliographic style practices and rise it to “Aula Virtual” for evaluation.

(3) Trips to the field and data analysis in laboratory and computer room. In this section shall be assessed the attitudes, knowledge and assistance to each of the activities. Assistance and the attitude will be evaluated in the following way:



1. *Exit to the field 1.* Up to 4 points

2. *Exit to the field 2.* Up to 4 points.

3. *Practice Lab 1.* Up to 2 points

4. *Practice lab 2.* Up to 2 points

5. *Classroom computing.*- Up to 2 points

TOTAL 14 POINTS

In order to assess this part it is necessary to obtain **at least 7 points** taking into account it must score in all the blocks (practical laboratory, computer room, field trips).

REFERENCES

Basic

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