



## COURSE DATA

## Data Subject

Code	33043
Name	Basic tools in biology
Cycle	Grade
ECTS Credits	6.0
Academic year	2017 - 2018

## Study (s)

Degree	Center	Acad. year	Period
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. SOURCES OF BIBLIOGRAPHIC INFORMATION (theory in classroom)**

Scientific information and documentation  
Information and communication in science.  
Historical development.  
The process of information transfer.  
Bibliographic information  
Primary documents.  
Secondary documents.  
Reference literature.  
Quality and reliability of references.  
Storage and retrieval of bibliographic information  
Storage of information  
Library facilities and documentation.  
Retrieval of information. Search strategies



## **2. PUBLICATION RESULTS SCIENTISTS (theory in classroom)**

Elements in scientific communication

Authorship

The art of writing a title.

Structuring of the work: the subject index.

Citation and bibliographical notes.

As prepare tables and graphs

Publications

The scientific article

Posters

Preparation and oral and written presentation of seminars.

Reports and projects in biology.

## **3. PRACTICAL SESSIONS IN COMPUTER CLASSROOM**

Session 01- Strategies of search.- Basic Management Databases.- MEDLINE and Science Citation Index.

Session 02- Bibliographic databases on the network.- Introduction to the management of REFWORKS

Session 03.- Creation and use of bibliographic styles using REFWORKS.

## **4. EXERCISES IN CLASSROOM SESSIONS**

01. Reading, viewing, discussion and summary of outreach work

02. Oral presentation from outreach work.

03. Practical exercises on scientific publications.

## **5. 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.

## **6. MANAGEMENT OF ANIMALS IN EXPERIMENTATION (theory in classroom)**

Session 1. Basic knowledge of manipulation of animals I: Need of animal experiments. Types of laboratory animals. Most used species. General biological aspects. Classification and health category. Facilities for laboratory animals.

Session 2. Basic knowledge of manipulation of animals II: Laboratory animal feeding and nutrition. Biological rhythms of the animal experimentation. Animal welfare. Pain and stress. Analgesia, anesthesia and euthanasia. Infections, bites and scratches. Hygiene and health monitoring of laboratory



animals. Zoonoses.

Session 3. Legislation on animal research: preparation in the handling of laboratory animals. Ethical and moral principles. Ethical committees. International law of the European Union on animal protection. Existing rules in Spain. Training of the personnel working with laboratory animals. Alternative methods to animal experiments.

## **7. 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.

## **8. 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.

## **9. 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
<b>TOTAL</b>	<b>150,00</b>	

**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 Science Citation Index. As a result of the practice, the student will receive search saves for further treatment.

o *Practice 2*-Introduction to 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.

o *Practice 3*-The tools available in REFWORKS related to the creation and use of styles will be bibliographic.



- *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.* Exercises in which, from a document and/or experimental data arise, students elaboraren different parts of a work. These exercises can also serve to enable students to deepen in the management of the English.

## **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 *Exit to the field*. Two outputs in the field of 6 hours.

- The *exit 1* will be held at the *Albufera Natural Park*. The output will have an overall length of 6 hours, 2 hours of maximum displacement to the area of realization of the departure and return, and 4 hours of field work. To maximize the profitability of the displacement is recommended to attend two groups of 16 students at a time, with two teachers.

- The *exit 2* will be held at *Turia Natural Park*. The output will have a duration of 6 hours, 1 hour maximum displacement to the area of realization of the output and 4 hours of field work.

- 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.

These activities should be made during the period of the academic year from September 2012 to June 2013. If they do not at this time not the subject may approve.

Drafting basic scientific article <sup>(1)</sup> **15 points**

Bibliographic search <sup>(2)</sup> **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-subjects activities (extra points) **5 points**

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***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)