

## COURSE DESCRIPTION

### COURSE DETAILS

Title (of the course): **RESPUESTAS DE LA CIENCIA A LAS PREGUNTAS DE LOS NIÑOS Y LAS NIÑAS**

Code: 100771

Degree/Master: **GRADO DE EDUCACIÓN INFANTIL**

Year: 4

Name of the module to which it belongs: OPTATIVIDAD

Field: RESPUESTAS DE LA CIENCIA A LAS PREGUNTAS DE LOS NIÑOS Y NIÑAS

Character: OPTATIVA

Duration: FIRST TERM

ECTS Credits: 6.0

Classroom hours: 60

Face-to-face classroom percentage: 40.0%

Study hours: 90

Online platform: moodle.uco.es

### LECTURER INFORMATION

Name: OTEROS MORENO, JOSÉ ANTONIO (Coordinator)

Department: BOTÁNICA, ECOLOGÍA Y FISIOLOGÍA VEGETAL

Area: BOTÁNICA

Office location: FCE (Planta 1ª, Ala dcha.)

E-Mail: jose.otros@uco.es

Phone: 957212555

URL web: <http://www.uco.es/botanica/es/personal/botanica/personal-docente-e-investigador/52->

### PREREQUISITES AND RECOMMENDATIONS

#### Prerequisites established in the study plan

None

#### Recommendations

None specified

### INTENDED LEARNING OUTCOMES

CE1

CE9

CE11

CM8.1

CM8.4

CM8.7

CM8.8

## COURSE DESCRIPTION

### OBJECTIVES

At the end of the course, students must be able to:

- Understand basic scientific concepts and the natural processes responsible for our most immediate environment.
- Use a specific vocabulary regarding basic scientific fields.
- Cite the most relevant milestones and people in the history of scientific knowledge in relation to the natural world and natural processes.
- Infer, from their knowledge of the history of science, the dynamic and mutable nature of scientific knowledge.
- Pose hypotheses and design simple experiments with which to validate hypotheses.
- Compare and evaluate the results of experiments.
- Design didactic resources for early childhood education with a solid scientific base.
- Search for, select and summarize verified scientific information.

### CONTENT

#### 1. Theory contents

**Unit 1.** Introduction to scientific knowledge.

**Unit 2.** Questions about the universe.

**Unit 3.** Understanding natural phenomena.

**Unit 4.** What is life?

**Unit 5.** The cell in everyday life.

**Unit 6.** Genetics: why are we the way we are?

**Unit 7.** Evolution and biodiversity.

#### 2. Practical contents

Practical lesson 1. Tools in the lab. Optical and stereoscopic microscope.

Practical lesson 2. Observation of microscopic life in indoor air. Fungal growth.

Practical lesson 3. Microscopic biodiversity in outdoor air. Airborne pollen.

Practical lesson 4. Microscopic biodiversity in a water drop.

Practical lesson 5. Eukaryotic cell I. The vegetal cell and tissues.

Practical lesson 6. Eukaryotic cell II. The animal cell and tissues.

Practical lesson 7. Eukaryotic cell III. Mitosis.

Practical lesson 8. Plant diversity: mosses, ferns and spermatophytes.

Practical lesson 9. Plant organs I: The leaves.

Practical lesson 10. Plant organs II: The flower.

Practical lesson 11. Plant organs III: The fruit.

Practical lesson 12. The fungi kingdom.

Practical lesson 13. Animal tissues and organs I.

Practical lesson 14. Animal tissues and organs II.

Practical lesson 15. Animal tissues and organs III.

### SUSTAINABLE DEVELOPMENT GOALS RELATED TO THE CONTENT

Good health and well-being

Climate action

Life on land

## COURSE DESCRIPTION

### METHODOLOGY

#### General clarifications on the methodology (optional)

The contents of the program are distributed in 7 theoretical units, supported with 15 practical lessons in the lab.

Each theoretical unit will be tackled by following a common methodology:

1. Diagnostic analysis of **questions** frequently asked by children in relation to the didactic unit. Relation with the contents of the unit. Summary of contents.
2. A conceptual map will be created containing specific **vocabulary** with which to introduce the unit and to improve linguistic wealth.
3. **Master classes**. Some lessons will be enriched with other interactive activities such as debates, analyses of scientific texts and current news, or reinforcement activities.
4. Review of the **key ideas** and skills acquired.

As non-classroom activities, the student will train his/her search and bibliographic management skills, teamwork, and the ability to synthesize and analyze during the execution of group work, all of which will then be defended in class.

#### Methodological adaptations for part-time students and students with disabilities and special educational needs

The student and professor could agree on a flexible tutoring period. But part-time students must have self learning skills.

Group work may be switched to individual work after an agreement has been reached between the student and the professor.

#### Face-to-face activities

Activity	Large group	Medium group	Total
<i>Debates</i>	2	-	2
<i>Group presentation</i>	4	-	4
<i>Group work (cooperative )</i>	2	-	2
<i>Lab practice</i>	-	15	15
<i>Lectures</i>	35	-	35
<i>Text commentary</i>	2	-	2
<b>Total hours:</b>	<b>45</b>	<b>15</b>	<b>60</b>

#### Off-site activities

Activity	Total
<i>Activities</i>	5
<i>Group work</i>	25

## COURSE DESCRIPTION

Activity	Total
Information search	10
Reference search	10
Self-study	40
<b>Total hours</b>	<b>90</b>

## WORK MATERIALS FOR STUDENTS

Case studies  
Exercises and activities  
Oral presentations  
Placement booklet  
References

## EVALUATION

Intended learning	Exams	Laboratory Practice	Oral Presentation	Project	Real and/or simulated tasks
CE1	X	X	X	X	X
CE11			X	X	
CE9	X		X	X	
CM8.1	X	X	X	X	X
CM8.4	X	X			X
CM8.7	X		X	X	
CM8.8		X		X	X
<b>Total (100%)</b>	<b>50%</b>	<b>10%</b>	<b>10%</b>	<b>15%</b>	<b>15%</b>
<b>Minimum grade</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

(\*)Minimum mark (out of 10) needed for the assessment tool to be weighted in the course final mark. In any case, final mark must be 5,0 or higher to pass the course.

## COURSE DESCRIPTION

### Attendance will be assessed?:

No

### General clarifications on instruments for evaluation:

The evaluation is carried out by weighing several evaluation instruments:

**50%:** Exam concerning the theory contents. This consists of 20 multiple choice test questions and several essay questions.

**25%:** Group project and oral defense. This must be developed throughout the course and must be defended orally. The written project accounts for 15% of the subject and the oral presentation for 10%.

**25%:** Laboratory practices. Here, the skills acquired during the practical lessons will be evaluated by means of a questionnaire on the "Real and/or simulated tasks" instrument (15% of the subject, evaluated at the end of the practice program). The other 10% of the practices will consist of the evaluation of the practical performance in every practical lesson with 0.075/lesson (out of a maximum of 1 point).

In general, the evaluation will consider the following criteria:

- Level of acquisition and understanding of the knowledge required.
- Spelling and grammar correction.
- Capacity to synthesize.
- Interest in the subject and effort made to develop the different work.

To pass the subject, a good level of linguistic and communicative competence will be essential. A lack of correction in the preparation of oral or written texts may have a negative impact on the final grade. An attitude of respect between men and women will be considered, both in the written texts and in the behavior in the classroom and with the rest of the university community.

**NOTE ON PLAGIARISM:** Plagiarizing is passing off the texts or ideas of other people as your own without indicating the source from which they were obtained. It is essential to cite all those documents that have been used to produce class work, journal papers, conference presentations, doctoral theses, etc. Plagiarism violates the basic pillars of the university institution and copying violates the main mission of the University. Any kind of plagiarized work will receive a grade of zero (0).

### Clarifications on the methodology for part-time students and students with disabilities and special educational needs:

Students with recognized disabilities will have adapted assessment tools, thus ensuring the equality of conditions. The evaluation criteria will be the same as for full-time students.

### Clarifications on the evaluation of the first extraordinary call and extra-ordinary call for completion studies:

The extraordinary call will consist of an exam concerning the theory contents (50% of the subject).

The rest of the marks will remain as those obtained: Lab practices (25% of the subject) and project-oral presentation (25% of the subject).

### Qualifying criteria for obtaining honors:

*Those established by the University of Córdoba*

## COURSE DESCRIPTION

### BIBLIOGRAPHY

#### 1. Basic Bibliography

- FREEMAN, S. et al. (2016) Biological Science (5th Edition). Pearson Education, Delhi ISBN: 93-3257-591-6
- AUDERSIRK, G. et al. (2016) Biology: Life on Earth with Physiology (10th Edition). Pearson, London ISBN: 01-3392-300-2
- MARGULIS, L., and SAGAN, D. (2000). *What is life?*. University of California Press, California ISBN: 05-2022-021-8

#### 2. Further reading

- CERVANTES MADRID, A. y LARDÓN MORENO, J. (1998). Conocimiento del Medio natural. Granada. ISBN: 84-8108-090-X
- CURTIS, H. y BARNES, N. (2000). Biología 6ª edición. Editorial Panamericana.
- MURPHY, P. y O'NEILL, L. (1999). La Biología del Futuro. ¿Qué es la vida? Cincuenta años después. Tusquest Editores S.A. Barcelona. ISBN 84-8310-632-9
- PEREZ MERCADER, J. (1997) ¿Qué sabemos del universo? De antes el bigbang al origen de la vida. Temas de debate Madrid ISBN 84-7444-872-7
- CHAM, J. and WHITESON, D. (2017). We have no idea: a guide to the unknown universe. Riverhead Books, New York ISBN 987-0-735-21663-1
- SOLOMON, E.P., BERG, L.R., MARTIN, D.W. y C. VILLEE. 1998. Biología de Villee (4ª ed.). Ed. McGraw-Hill Interamericana.

### COORDINATION CRITERIA

Tasks performance

### SCHEDULE

Period	Debates	Group presentation	Group work (cooperative)	Lab practice	Lectures	Text commentary
1# Week	1,0	0,0	0,0	1,0	2,0	0,0
2# Week	0,0	0,0	0,0	1,0	3,0	0,0
3# Week	0,0	0,0	0,0	1,0	3,0	0,0
4# Week	0,0	0,0	0,0	1,0	2,0	1,0
5# Week	0,0	0,0	0,0	1,0	3,0	0,0
6# Week	0,0	0,0	0,0	1,0	3,0	0,0
7# Week	0,0	0,0	0,0	1,0	3,0	0,0
8# Week	1,0	0,0	0,0	1,0	2,0	0,0
9# Week	0,0	0,0	0,0	1,0	3,0	0,0
10# Week	0,0	0,0	0,0	1,0	3,0	0,0



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## COURSE DESCRIPTION

Period	Debates	Group presentation	Group work (cooperative )	Lab practice	Lectures	Text commentary
11# Week	0,0	0,0	0,0	1,0	3,0	0,0
12# Week	0,0	0,0	0,0	1,0	2,0	1,0
13# Week	0,0	0,0	0,0	1,0	3,0	0,0
14# Week	0,0	1,0	2,0	1,0	0,0	0,0
15# Week	0,0	3,0	0,0	1,0	0,0	0,0
<b>Total hours:</b>	<b>2,0</b>	<b>4,0</b>	<b>2,0</b>	<b>15,0</b>	<b>35,0</b>	<b>2,0</b>

The methodological strategies and the evaluation system contemplated in this Course Description will be adapted according to the needs presented by students with disabilities and special educational needs in the cases that are required.

## CONTINGENCY PLAN: CASE SCENARIO A

Case scenario A will correspond to a diminished on-site academic activity due to social distancing measures affecting the permitted capacity of classrooms.

## METHODOLOGY

### General clarifications on the methodology on case scenario A

A multimodal (hybrid) teaching system will be adopted, combining both on-site and remote classes via videoconference (synchronous) that will be held in the timetable approved by the corresponding Faculty or School. The time distribution of teaching activities (both on-site and remote) will be decided by the aforementioned Faculties and Schools bearing in mind the permitted capacity of classrooms and social distancing measures as established at that time.

The contents of the program are distributed in 7 theoretical units, supported with 15 practical lessons in the lab.

Each theoretical unit will be tackled by following a common methodology:

1. Diagnostic analysis of **questions** frequently asked by children in relation to the didactic unit. Relation with the contents of the unit. Summary of contents.
2. A conceptual map will be created containing specific **vocabulary** with which to introduce the unit and to improve linguistic wealth.
3. **Master classes**. Some lessons will be enriched with other interactive activities such as debates, analyses of scientific texts and current news, or reinforcement activities.
4. Review of the **key ideas** and skills acquired.

As non-classroom activities, the student will train his/her search and bibliographic management skills, teamwork, and the ability to synthesize and analyze during the execution of group work, all of which will then be defended in class.

## COURSE DESCRIPTION

## EVALUATION

Intended learning	Exams	Laboratory Practice	Oral Presentation	Project	Real and/or simulated tasks
CE1	X	X	X	X	X
CE11			X	X	
CE9	X		X	X	
CM8.1	X	X	X	X	X
CM8.4	X	X			X
CM8.7	X		X	X	
CM8.8		X		X	X
<b>Total (100%)</b>	<b>50%</b>	<b>10%</b>	<b>10%</b>	<b>15%</b>	<b>15%</b>
<b>Minimum grade</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

(\*)Minimum mark (out of 10) needed for the assessment tool to be weighted in the course final mark. In any case, final mark must be 5,0 or higher to pass the course.

**Attendance will be assessed (Scenario A)?:**

No

**General clarifications on instruments for evaluation (Scenario A):**

The evaluation is carried out by weighing several evaluation instruments:

**50%:** Exam concerning the theory contents. This consists of 20 multiple choice test questions and several essay questions.

**25%:** Group project and oral defense. This must be developed throughout the course and must be defended orally. The written project accounts for 15% of the subject and the oral presentation for 10%.

**25%:** Laboratory practices. Here, the skills acquired during the practical lessons will be evaluated by means of a questionnaire on the "Real and/or simulated tasks" instrument (15% of the subject, evaluated at the end of the practice program). The other 10% of the practices will consist of the evaluation of the practical performance in every practical lesson with 0.075/lesson (out of a maximum of 1 point).

In general, the evaluation will consider the following criteria:

- Level of acquisition and understanding of the knowledge required.
- Spelling and grammar correction.
- Capacity to synthesize.
- Interest in the subject and effort made to develop the different work.

To pass the subject, a good level of linguistic and communicative competence will be essential. A lack of correction in the preparation of oral or written texts may have a negative impact on the final grade. An attitude of respect between men and women will be considered, both in the written texts and in the behavior in the classroom and with the rest of the university community.



## COURSE DESCRIPTION

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### **Clarifications on the methodology for part-time students and students with disabilities and special educational needs (Scenario A):**

Students with recognized disabilities will have adapted assessment tools, thus ensuring the equality of conditions. The evaluation criteria will be the same as for full-time students.

## CONTINGENCY PLAN: CASE SCENARIO B

Case scenario B will bring about a suspension of all on-site academic activities as a consequence of health measures.

## METHODOLOGY

### **General clarifications on the methodology on case scenario B**

On-site teaching activities will be held via videoconference (synchronous) in the timetable approved by the corresponding Faculty or School. Alternative activities will be proposed for reduced groups in order to guarantee the acquisition of course competences.

The contents of the program are distributed in 7 theoretical units, supported with 15 practical lessons.

Each theoretical unit will be tackled by following a common methodology:

1. Diagnostic analysis of **questions** frequently asked by children in relation to the didactic unit. Relation with the contents of the unit. Summary of contents.
2. A conceptual map will be created containing specific **vocabulary** with which to introduce the unit and to improve linguistic wealth.
3. **Master classes.** Some lessons will be enriched with other interactive activities such as debates, analyses of scientific texts and current news, or reinforcement activities.
4. Review of the **key ideas** and skills acquired.

As non-classroom activities, the student will train his/her search and bibliographic management skills, teamwork, and the ability to synthesize and analyze during the execution of group work, all of which will then be defended in class.

## COURSE DESCRIPTION

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Intended learnig	Exams	Laboratory Practice	Oral Presentation	Project	Real and/or simulated tasks
CE1	X	X	X	X	X
CE11			X	X	
CE9	X		X	X	
CM8.1	X	X	X	X	X
CM8.4	X	X			X
CM8.7	X		X	X	
CM8.8		X		X	X
<b>Total (100%)</b>	<b>50%</b>	<b>10%</b>	<b>10%</b>	<b>15%</b>	<b>15%</b>
<b>Minimum grade</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

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Moodle Tools	Exposición oral	Exámenes	Proyecto	Pruebas de ejecución de tareas reales y/o simuladas	Prácticas de laboratorio
Cuestionario				X	
Participación					X
Pruebas simultáneas por videoconferencia		X			
Tarea			X		
Videoconferencia	X				X

## Attendance will be assessed (Scenario B)?:

No

## General clarifications on instruments for evaluation (Scenario B):

The evaluation is carried out by weighing several evaluation instruments:

**50%:** Exam concerning the theory contents. This consists of 20 multiple choice test questions and several essay questions.

**25%:** Group project and oral defense. This must be developed throughout the course and must be defended orally. The written project accounts for 15% of the subject and the oral presentation for 10%.

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## COURSE DESCRIPTION

practice program). The other 10% of the practices will consist of the evaluation of the practical performance in every practical lesson with 0.075/lesson (out of a maximum of 1 point).

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- Capacity to synthesize.
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To pass the subject, a good level of linguistic and communicative competence will be essential. A lack of correction in the preparation of oral or written texts may have a negative impact on the final grade. An attitude of respect between men and women will be considered, both in the written texts and in the behavior in the classroom and with the rest of the university community.

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### **Clarifications on the methodology for part-time students and students with disabilities and special educational needs (Scenario B):**

Students with recognized disabilities will have adapted assessment tools, thus ensuring the equality of conditions. The evaluation criteria will be the same as for full-time students.