

**1. General information****Course:** APPLIED BOTANY AND PLANT ECOLOGY**Type:** ELECTIVE**Degree:** 392 - BACHELOR'S DEGREE IN PRIMARY EDUCATION (AB)**Center:** 101 - FACULTY OF EDUCATION IN ALBACETE**Year:** 3**Main language:** Spanish**Use of additional languages:****Web site:****Code:** 46359**ECTS credits:** 6**Academic year:** 2021-22**Group(s):** 10 17**Duration:** C2**Second language:****English Friendly:** Y**Bilingual:** N**Lecturer:** PABLO FERRANDIS GOTOR - Group(s): 10 17

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ETSIAMB Albacete	PROD. VEGETAL Y TGIA. AGRARIA	2814	pablo.ferrandis@uclm.es	Ask for previous meeting by e-mail

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2. Pre-Requisites

There is no prerequisite for studying the subject

3. Justification in the curriculum, relation to other subjects and to the profession

Applied Botany and Ecology forms a part of the Science Minor in the curriculum of Primary Education degree in the UCLM. It is closely connected with the rest of course units in the Science Minor (e.g., Environmental Education, The Teaching of Sciences in Primary Education). Along with them, this course unit provides the students with a coherent academic orientation to acquire skills on the teaching of sciences. In this line, Applied Botany and Ecology offers students theoretical and practical contents which are effective for the design of didactical materials and activities around the plants and ecosystems.

The knowledge of plants, their origin and phylogenetic relationships, the use of them by the mankind, and their role on the functioning of ecosystems and the conformation of vegetal landscapes, provides with a highly valuable didactic frame for carrying out the teaching profession in Primary Education, throughout which consolidate a innovative society being also aware and respectful with the environment, and thus promoting social systems built on the basis of sustainable development.

4. Degree competences achieved in this course**Course competences**

Code	Description
CB02	Apply their knowledge to their job or vocation in a professional manner and show that they have the competences to construct and justify arguments and solve problems within their subject area.
CB03	Be able to gather and process relevant information (usually within their subject area) to give opinions, including reflections on relevant social, scientific or ethical issues.
CB04	Transmit information, ideas, problems and solutions for both specialist and non-specialist audiences.
CG09	Value individual and collective responsibility for a sustainable future.
CT03	Correct oral and written communication.
MCN.05	Utilise scientific arguments to produce attitude and behavioral changes.
MCN.06	Relate the distinct disciplines of the Natural Sciences.
MCN.08	Analyse the natural heritage of the Region.
MCN.12	Plan field research.

5. Objectives or Learning Outcomes**Course learning outcomes****Description**

Know the main aspects of plant morphology.
Know the reproductive processes of vascular plants.
Develop a critical spirit towards environmental problems of current society
Develop an attitude of respect and care of environment
Describe the main ecological relations and its foundations
Evaluate the impact of the human action about natural resources and in health
Involve children in the solution of environmental problems.
Introduction to the evolutionary origin and phylogenetic classification of the plant kingdom
Recognize the importance of biodiversity and the use that society makes of it
Solve scientific problems related to curricular contents of Primary Education

Contextualize teaching-learning activities to the interests of the child, to develop curiosity as a basic motor in the acquisition of knowledge
 Develop scientific activities appropriate to the intellectual development of the child.
 Elaborate field activities related to natural sciences
 Recognize the role of plants in the functioning of ecosystems. Analyze and diagnose the landscape of a territory
 Recognize the main plants of the environment
 Value the importance of the sustainable use preserving natural resources

6. Units / Contents

Unit 1: INTRODUCTION TO BOTANY. Botany: concept and history. What is a plant? Phylogenetic relationships and plant classification. Taxonomy and nomenclature of plants.

Unit 2: VEGETATIVE STRUCTURES. Root, stem, and leaves.

Unit 3: REPRODUCTIVE STRUCTURES. Flower and fruit.

Unit 4: PRACTICE 1. KNOWING THE MORPHOLOGICAL STRUCTURE OF PLANTS. Observation and description of vegetative and reproductive structures of plants in the laboratory.

Unit 5: PRACTICE 2. IDENTIFICATION OF PLANTS. Identification of plant species in the laboratory by means of dichotomic guides.

Unit 6: PRACTICE 3. PREPARING AN HERBARIUM. Instructions for and preparation of a basic didactic herbarium

Unit 7: PRACTICE 4. THE MORPHOLOGICAL DIVERSITY OF PLANTS. Preparation of a collage with different kinds of leaves and flowers.

Unit 8: PRACTICE 5. THE BOTANIC FAMILY AS A COHERENT TAXONOMIC LEVEL FOR THE STUDY OF BOTANY. Bibliographic research on botanic families. Oral presentations and debate.

Unit 9: PLANTS AND SOCIETY: THE USE OF PLANTS. The domestication of plants. Food plants. Medicinal, psychoactive and toxic plants. Industrial plants (textile, construction, wood and cabinetmaking, chemical industry, energy). Ornamental plants.

Unit 10: PRACTICE 6. ETNOBOTANY; THE HISTORY OF THE USE OF PLANTS. Information search (Internet, surveys) on the traditional use of plants. Oral presentations and debate.

Unit 11: PRACTICE 7. VEGETABLE GARDEN FOR EDUCATIONAL PURPOSES. Preparation of a didactic vegetable garden in the Castilla-La Mancha Botanic Garden.

Unit 12: PRACTICE 8. WHAT IS THE USE OF PLANTS? Preparation of soap, unguent, figures, with plants

Unit 13: INTRODUCTION TO ECOLOGY. The concept and history of ecology. The ecosystem: biotope and biocenosis. Divisions of ecology. Distribution and abundance of organisms. The use of resources and ecological niche.

Unit 14: THE FUNCTIONING OF ECOSYSTEMS. Relationships among organisms. The structure of the community. Matter and energy cycles. The ecological succession: interpretation and diagnosis of plant landscapes.

Unit 15: DIDACTIC ROUTES: THE BOTANIC GARDEN. Guided visit the Castilla-La Mancha Botanic Garden. Design of a didactic route for primary School students.

Unit 16: DECOMPOSERS: THE SILENT TROPHIC NET IN THE SOIL. Observation of organisms participants in the trophic net of decomposers.

ADDITIONAL COMMENTS, REMARKS

The course unit is organized in four teaching modules, according to the following scheme:

MODULE I. INTRODUCTION TO BOTANY

- Theory: Unit 1

MODULE II. MORPHOLOGY AND ANATOMY OF PLANTS

- Theory: Units 2-3
- Practices: Units 4-8

MODULE III. PLANTS AND SOCIETY

- Theory: Unit 9
- Practices: Units 10-12

MODULE IV. ECOLOGY

- Theory: Units 13-14
- Practices: Units 15-16

7. Activities, Units/Modules and Methodology

Training Activity	Methodology	Related Competences (only degrees before RD 822/2021)	ECTS	Hours	As	Com	Description
Project or Topic Presentations [ON-SITE]	Lectures	CB02 CB03 CG09 MCN.05 MCN.06	1.52	38	Y	Y	Explanation of theoretical contents of the course unit, from the didactic material provided to students in the digital platform Campus Virtual. Participation of students in active debates will be promoted during lessons. Such a participation will be evaluated and considered for the computation of final marks. Recoverable activity in the extraordinary exam.
Laboratory practice or sessions							1.- Anatomic and morphologic study of plants in the laboratory; 2.- Identification of plant species by means of dichotomic guides; 3.- Instructions and practice on the preparation of herbarium sheets; 4.-

[ON-SITE]	Practical or hands-on activities	CB02 CB03	0.4	10	Y	Y	Preparation of traditional products from plants; 5.- Observation of decomposers in soil samples. Recoverable activity by the repetition of the report of practices for the extraordinary examination.
Writing of reports or projects [OFF-SITE]	Self-study	CB03 CB04 MCN.12	0.8	20	Y	Y	1.- Preparation of a simple didactic herbarium assisted by the teacher; 2.- Preparation of a didactic collage with several structures of plants. Recoverable activity by the repetition of the report of practices for the extraordinary examination.
Analysis of articles and reviews [OFF-SITE]	Reading and Analysis of Reviews and Articles	CB03 MCN.06	0.4	10	Y	N	1.- bibliographic search on botanic families; 2.- bibliographic search on the traditional use of plants. Recoverable activity in the extraordinary exam.
Writing of reports or projects [OFF-SITE]	Self-study	CB02 MCN.06	0.24	6	Y	Y	1.- Preparation of an individual report on botanic families; 2.- Preparation of an individual report on the traditional use of plants. The report characteristics will be indicated by the teacher. Plagiarism is penalized (Plagiarism policy: See article 9 of Students Evaluation Rules). Recoverable activity by the repetition of reports for the extraordinary examination.
Project or Topic Presentations [ON-SITE]	Group Work	CB04 MCN.05 MCN.06	0.32	8	Y	Y	1.- Oral, individual communication and debate on botanic families; 2.- Oral, individual communication and debate on the traditional uses of plants. Recoverable activity in the extraordinary exam.
Field work [ON-SITE]	Guided or supervised work	CB03 CB04 MCN.08	0.16	4	Y	N	1.- Preparation of a didactic vegetable garden; 2.- Visit to the Castilla-La Mancha Botanic Garden: preparation of didactic routes to teach plant species and native ecosystems. Recoverable activity by the extraordinary exam.
Writing of reports or projects [OFF-SITE]	Self-study	CB02 CB03 CB04 MCN.12	0.48	12	Y	Y	Preparation of a report of the practices performed during the year. The report characteristics will be indicated by the teacher. Plagiarism is penalized (plagiarism policy: See article 9 of Students Evaluation Rules). Recoverable activity by the repetition of the report for the extraordinary examination.
Study and Exam Preparation [OFF-SITE]	Self-study	CB02 CB03 CB04 MCN.06	1.68	42	Y	Y	This activity includes three written exams on the theoretical contents of the course unit: 1st exam: Modules I and II; 2nd exam: Module III; 3rd exam: Module IV. Recoverable activity by the extraordinary exam.
Total:			6	150			
Total credits of in-class work: 2.4			Total class time hours: 60				
Total credits of out of class work: 3.6			Total hours of out of class work: 90				

As: Assessable training activity

Com: Training activity of compulsory overcoming (It will be essential to overcome both continuous and non-continuous assessment).

8. Evaluation criteria and Grading System			
Evaluation System	Continuous assessment	Non-continuous evaluation*	Description
Theoretical papers assessment	10.00%	10.00%	Students in the non-continuous evaluation itinerary must prepare the same theoretical papers to those prepared by the rest of students: (1) a paper on botanic families and (2) a paper on the traditional use of plants. The teacher will assist them in this task.
Assessment of active participation	20.00%	0.00%	Evaluation of students' participation in debates promoted by the teacher during theoretical lessons.
Laboratory sessions	15.00%	0.00%	Evaluation of students' participation in debates promoted by the teacher during practical lessons.
Progress Tests	30.00%	0.00%	Three progress exams (10% each): 1st exam: Modules I and II;

Fieldwork assessment	10.00%	10.00%	2nd exam: Module III- 3rd exam: Module IV Students in the non-continuous evaluation itinerary must prepare the same fieldworks to those prepared by the rest of students: (1) simple didactic herbarium and (2) didactic collage with plant structures. The teacher will assist them in this task.
Oral presentations assessment	5.00%	0.00%	
Practicum and practical activities reports assessment	10.00%	10.00%	Students in the non-continuous evaluation itinerary must prepare a program of didactic practices for whatever level of Primary Education they chose. The teacher will assist them in this task.
Final test	0.00%	70.00%	Students in the non-continuous evaluation itinerary will examine in an unique, final exam, on all the theoretical contents in the set of the progress exams included in the evaluation of the rest of students.
Total:	100.00%	100.00%	

According to art. 4 of the UCLM Student Evaluation Regulations, it must be provided to students who cannot regularly attend face-to-face training activities the passing of the subject, having the right (art. 12.2) to be globally graded, in 2 annual calls per subject, an ordinary and an extraordinary one (evaluating 100% of the competences).

Evaluation criteria for the final exam:

Continuous assessment:

The requisite to be included in this itinerary is to participate in over 50% of evaluable activities. Any student can change to the non-continuous itinerary if she/he has not participated in at least 50% of evaluable activities.

The student's participation in and contribution to the debate during lessons and practices promoted by the teacher. To do so, didactic material will be available in advance in the learning digital platform Campus Virtual.

There will be three progress exams throughout the year: 1st exam: Modules I and II; 2nd exam: Module III; 3rd exam: Module IV. They will consist of written exams, with both theoretical and practical questions on contents studied in the lessons with the teacher.

The mark scale is 0-10. The student will pass the subject from a mark of 5. It is necessary to surpass a mark of at least 4 in each evaluable part: set of progress exams, field works, oral communications, participation on debates, preparation of reports. Plagiarism in reports will be penalized. In addition, reports must be prepared individually.

If applicable, any modifications or adaptations needed in the teaching guides as a result of a change in the teaching or evaluation model derived from the evolution of the pandemic will be documented in a later addendum.

Non-continuous evaluation:

Students in the non-continuous itinerary (i.e., they do not come to class) must pass an unique, final exam on all the contents in the subject, whose mark weights 70% on the final mark. The preparation of fieldworks (a simple didactic herbarium; a didactic collage of plant structures; 10% overall), theoretical papers (a report on botanic families; a report on the traditional use of plants; 10% overall), and a program of didactic practices (10%) will complete the final mark in the subject. For these tasks, they will be assisted by the teacher.

If applicable, any modifications or adaptations needed in the teaching guides as a result of a change in the teaching or evaluation model derived from the evolution of the pandemic will be documented in a later addendum.

Specifications for the resit/retake exam:

The extraordinary examination will consist of an exam of all the contents studied in the subject (70% of the final mark). Questions can ask on theoretical and practical subject. In addition, the student can recover the report of practices by a programation of didactic practices (10%) and autonomous works (10% for fieldworks + 10% for theoretical papers).

If applicable, any modifications or adaptations needed in the teaching guides as a result of a change in the teaching or evaluation model derived from the evolution of the pandemic will be documented in a later addendum.

Specifications for the second resit / retake exam:

Same to those in the resit/retake exam section

9. Assignments, course calendar and important dates	
Not related to the syllabus/contents	
Hours	hours
Writing of reports or projects [AUTÓNOMA][Self-study]	12
Study and Exam Preparation [AUTÓNOMA][Self-study]	42
General comments about the planning: The temporal cronogram is illustrative and can suffer slight shifts due to unexpected circumstances throughout the year.	
Unit 1 (de 16): INTRODUCTION TO BOTANY. Botany: concept and history. What is a plant? Phylogenetic relationships and plant classification. Taxonomy and nomenclature of plants.	
Activities	Hours
Project or Topic Presentations [PRESENCIAL][Lectures]	4
Analysis of articles and reviews [AUTÓNOMA][Reading and Analysis of Reviews and Articles]	3
Teaching period: 1 week	
Unit 2 (de 16): VEGETATIVE STRUCTURES. Root, stem, and leaves.	
Activities	Hours
Project or Topic Presentations [PRESENCIAL][Lectures]	10
Teaching period: 2.5 wk	
Unit 3 (de 16): REPRODUCTIVE STRUCTURES. Flower and fruit.	
Activities	Hours
Project or Topic Presentations [PRESENCIAL][Lectures]	6
Teaching period: 1.5 wk	
Unit 4 (de 16): PRACTICE 1. KNOWING THE MORPHOLOGICAL STRUCTURE OF PLANTS. Observation and description of vegetative and reproductive structures of plants in the laboratory.	
Activities	Hours
Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities]	2
Teaching period: 0.5 wk	

Unit 5 (de 16): PRACTICE 2. IDENTIFICATION OF PLANTS. Identification of plant species in the laboratory by means of dichotomic guides.	
Activities	Hours
Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities]	2
Teaching period: 0.5 wk	
Unit 6 (de 16): PRACTICE 3. PREPARING AN HERBARIUM. Instructions for and preparation of a basic didactic herbarium	
Activities	Hours
Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities]	2
Writing of reports or projects [AUTÓNOMA][Self-study]	15
Teaching period: 0.5 wk	
Unit 7 (de 16): PRACTICE 4. THE MORPHOLOGICAL DIVERSITY OF PLANTS. Preparation of a collage with different kinds of leaves and flowers.	
Activities	Hours
Writing of reports or projects [AUTÓNOMA][Self-study]	5
Teaching period: 0.5 wk	
Unit 8 (de 16): PRACTICE 5. THE BOTANIC FAMILY AS A COHERENT TAXONOMIC LEVEL FOR THE STUDY OF BOTANY. Bibliographic research on botanic families. Oral presentations and debate.	
Activities	Hours
Analysis of articles and reviews [AUTÓNOMA][Reading and Analysis of Reviews and Articles]	5
Writing of reports or projects [AUTÓNOMA][Self-study]	4
Teaching period: 1 wk	
Unit 9 (de 16): PLANTS AND SOCIETY: THE USE OF PLANTS. The domestication of plants. Food plants. Medicinal, psychoactive and toxic plants. Industrial plants (textile, construction, wood and cabinetmaking, chemical industry, energy). Ornamental plants.	
Activities	Hours
Project or Topic Presentations [PRESENCIAL][Lectures]	8
Teaching period: 2 wk	
Unit 10 (de 16): PRACTICE 6. ETNOBOTANY; THE HISTORY OF THE USE OF PLANTS. Information search (Internet, surveys) on the traditional use of plants. Oral presentations and debate.	
Activities	Hours
Analysis of articles and reviews [AUTÓNOMA][Reading and Analysis of Reviews and Articles]	5
Writing of reports or projects [AUTÓNOMA][Self-study]	4
Teaching period: 1 wk	
Unit 11 (de 16): PRACTICE 7. VEGETABLE GARDEN FOR EDUCATIONAL PURPOSES. Preparation of a didactic vegetable garden in the Castilla-La Mancha Botanic Garden.	
Activities	Hours
Field work [PRESENCIAL][Guided or supervised work]	2
Teaching period: 0.5 wk	
Unit 12 (de 16): PRACTICE 8. WHAT IS THE USE OF PLANTS? Preparation of soap, unguent, figures, with plants	
Activities	Hours
Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities]	2
Teaching period: 0.5 wk	
Unit 13 (de 16): INTRODUCTION TO ECOLOGY. The concept and history of ecology. The ecosystem: biotope and biocenosis. Divisions of ecology. Distribution and abundance of organisms. The use of resources and ecological niche.	
Activities	Hours
Project or Topic Presentations [PRESENCIAL][Lectures]	4
Analysis of articles and reviews [AUTÓNOMA][Reading and Analysis of Reviews and Articles]	3
Teaching period: 1 wk	
Unit 14 (de 16): THE FUNCTIONING OF ECOSYSTEMS. Relationships among organisms. The structure of the community. Matter and energy cycles. The ecological succession: interpretation and diagnosis of plant landscapes.	
Activities	Hours
Project or Topic Presentations [PRESENCIAL][Lectures]	6
Teaching period: 1.5 wk	
Unit 15 (de 16): DIDACTIC ROUTES: THE BOTANIC GARDEN. Guided visit the Castilla-La Mancha Botanic Garden. Design of a didactic route for primary School students.	
Activities	Hours
Field work [PRESENCIAL][Guided or supervised work]	2
Teaching period: 0.5 wk	
Unit 16 (de 16): DECOMPOSERS: THE SILENT TROPHIC NET IN THE SOIL. Observation of organisms participants in the trophic net of decomposers.	
Activities	Hours
Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities]	2
Teaching period: 0.5 wk	
Global activity	
Activities	hours
Writing of reports or projects [AUTÓNOMA][Self-study]	8
Project or Topic Presentations [PRESENCIAL][Lectures]	38
Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities]	10
Writing of reports or projects [AUTÓNOMA][Self-study]	20
Analysis of articles and reviews [AUTÓNOMA][Reading and Analysis of Reviews and Articles]	16
Field work [PRESENCIAL][Guided or supervised work]	4
Writing of reports or projects [AUTÓNOMA][Self-study]	12
Study and Exam Preparation [AUTÓNOMA][Self-study]	42
Total horas: 150	

10. Bibliography and Sources						
Author(s)	Title/Link	Publishing house	City	ISBN	Year	Description
Izco, J. & al.	Botánica	McGraw-Hill-Interamer.	Madrid	84-486-0182-3	1997	Tratado de botánica general y geobotánica
Levetin L. & K. McMahon	Plants and Society (2nd edition)	McGraw-Hill	Boston	0-697-34552-1	1999	Botánica aplicada
Pablo Ferrandis	Apuntes de Botánica Aplicada y Ecología					Material didáctico elaborado y actualizado por el profesor. Disponible en Campus Virtual
Pablo Ferrandis	Presentaciones de Botánica Aplicada y Ecología					Material didáctico elaborado y actualizado por el profesor. Disponible en Campus Virtual
Simpson B.B. & M.C. Ogorzaly	Economic Botany. Plants in Our World (3rd edition)	McGraw-Hill International Ed.	Boston	0-07-118188-1	2001	Botánica aplicada
Smith R.L. y T.M. Smith	Ecología (4ª edición)	Pearson Educación	Madrid		2001	Tratado de ecología general
Begon M., J.L. Harper, C.R. Townsend	Ecología : individuos, poblaciones y comunidades	Omega	Barcelona	84-282-1152-3	1999	Tratado de ecología general
Terradas J.	Ecología de la Vegetación. De la Ecofisiología de las Plantas a la Dinámica de Comunidades y Paisajes	Omega	Barcelona		2001	Tratado de ecología vegetal