

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

Code	44299
Name	Diversity and phylogeny of plants and fungi
Cycle	Master's degree
ECTS Credits	3.0
Academic year	2023 - 2024

Study (s)

Degree	Center	Acad. year	Period
2200 - M. U. en Paleontología Aplicada	Faculty of Biological Sciences	1	First term

Subject-matter

Degree	Subject-matter	Character
2200 - M. U. en Paleontología Aplicada	3 - Advanced scientific training	Optional

Coordination

Name	Department
GUARA REQUENA, MIGUEL	32 - Botany

SUMMARY

This course is designed as an educational complement and included in the module "Basic training" as an extension of training in the knowledge of organisms. The main groups of plants (cyanobacteria, algae, plants) and fungi are studied from an evolutionary perspective.

From the proposed domains of life and supergroups of organisms, a synthesis of plant diversity and fungi with a phylogenetic perspective is presented. The characteristics of the most important study groups and greater attention to the organization, reproductive aspects and ecology in those groups with higher occurrence and relevance in the fossil record will be provided.

Domain Bacteria: cyanobacteria, which form the basis of photosynthetic organisms being the origin of plastids of photosynthetic eukaryotes.

Within the domain Eucariaseveral supergroups are studied; Opisthokonta where mushrooms are placed; Chromalveolata of which coccolitophorids, brown algae and diatoms are included and Archaeplastidasupergroup comprising red algae, green, terrestrial plants. In vascular plants anatomy and morphology of the stems and leaves and reproductive structures mainly spores and pollen are the most abundant fossil record of terrestrial plants is studied.



To address all these contents in 28 hours students will have study material in addition to the recommended bibliography.

Most sessions are theoretical-practical in order to observe material of studied group; given the limited time representative species will be chosen in each case.

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 restrictions concerning engagement with other courses.

OUTCOMES

2200 - M. U. en Paleontología Aplicada

- Students should apply acquired knowledge to solve problems in unfamiliar contexts within their field of study, including multidisciplinary scenarios.
- Students should communicate conclusions and underlying knowledge clearly and unambiguously to both specialized and non-specialized audiences.
- Be able to access to information tools in other areas of knowledge and use them properly.
- Be able to communicate and disseminate scientific ideas.
- Ser capaces de trabajar en equipo con eficiencia en su labor profesional o investigadora, adquiriendo la capacidad de participar en proyectos de investigación y colaboraciones científicas o tecnológicas
- Ser capaces de realizar una toma rápida y eficaz de decisiones en situaciones complejas de su labor profesional o investigadora, mediante el desarrollo de nuevas e innovadoras metodologías de trabajo adaptadas al ámbito científico/investigador, tecnológico o profesional en el que se desarrolle su actividad.
- Ser capaces de acceder a la información necesaria en el ámbito específico de la materia (bases de datos, artículos científicos, etc.) y tener suficiente criterio para su interpretación y empleo.
- Aplicar la Ciencia desde la óptica social y económica, potenciando la transferencia del conocimiento a la Sociedad.
- Capacidad para preparar, redactar y exponer en público informes y proyectos de forma clara y coherente, defenderlos con rigor y tolerancia y responder satisfactoriamente a las críticas que pudieren derivarse de su exposición.



- Asumir el compromiso ético y la sensibilidad hacia los problemas medioambientales, hacia el patrimonio natural y cultural.
- Conocer y comprender en profundidad la naturaleza de la biodiversidad y sus relaciones ecosistémicas tanto en la actualidad como en el pasado.
- Conocer y entender la paleodiversidad de los seres vivos, sus relaciones ecosistémicas y la distribución paleogeográfica alcanzada por los principales grupos de seres vivos a lo largo de la historia de la Tierra.
- Comprender en profundidad la naturaleza histórica del proceso evolutivo, tanto en sus aspectos de irrepetibilidad y contingencia, como en aquellos vinculados al cumplimiento de leyes de la naturaleza de toda índole y, por tanto, de necesidad.
- Conocer y entender las causas del cambio climático y los proxies (estudio de diatomeas, foraminíferos, anillos de crecimiento de árboles, núcleos de hielo, datos del clima actual, etc.) usados para la caracterización de climas del pasado.

LEARNING OUTCOMES

1. Recognition of the major taxonomic groups of plants and fungi.
2. Recognition of vegetative and reproductive organs and structures of plants and fungi.
3. Know how to interpret scientific papers related to Botany.
4. Establish the relationship between the acquired knowledge and its practical applications especially those related to the fossil record.

DESCRIPTION OF CONTENTS

1. Introductory session

1-The Tree of Life and its supergroups: organisms performing oxygenic photosynthesis and fungi. Introductory session, one hour theoretical.

2. Prokaryotes, Domain Bacteria: Cyanobacteria.

2 hours, 1 Theoretical / practical session

3. Domain Eucarya: Supergroup Opisthokonta: fungi, structure and diversity.

2 hours, 1 Theoretical / practical session



4. Supergroup S-A-R: haptophytes, diatoms and brown algae.

2 hours, 1 Theoretical / practical session

5. Supergroup Archaeplastida: Red algae. Green algae: Chlorophyta and Streptophyta.

4 hours, 2 sessions theoretical / practical

6. Embryophytes: bryophytes.

2 hours, 1 Theoretical / practical session

7. Vascular plants: vegetative Organization

2 hours, 1 Theoretical / practical session

8. Lycophytes and pteridophytes

2 hours, 1 Theoretical / practical session

9. Seed plants: organization, reproduction, seed

1 hour theoretical.

10. Gymnosperms

2 hours theoretical / practical session

11. Angiosperms: organization, anatomy, flower

2 hours theoretical / practical session

12. Angiosperms: Pollen

4 hours, 2 theoretical / practical session

13. Diversity of angiosperms

2 hours theoretical / practical session

**WORKLOAD**

ACTIVITY	Hours	% To be attended
Theory classes	20,00	100
Laboratory practices	10,00	100
TOTAL	30,00	

TEACHING METHODOLOGY

Except Sessions 1 and 9 are 1 hour theoretical, the remaining 11 are theoretical/practical sessions of 2 hours. In these sessions there will be a theoretical introduction to last about 45 minutes with the help of a presentation and after material of the group studied will be observed, this approach seems the most appropriate especially when it comes to a small group of Master students who already have skills and maturity to work in the laboratory. Students should prepare a seminar in groups of 2-3 on topics related to the subject that are of interest.

EVALUATION

For the evaluation of the subject will be considered:

- Classes assistance 10
- Report of the labs and seminar 50 %
- Final test about the contents of the course 40 %

REFERENCES**Basic**

- RAVEN, P.H.; EVERT, R.F. & S. E. EICHHORN (2005). 7ª ed. Biology of plants. W.H. Freeman and Company. New York, 686 pp.
- SIMPSON, M. G. (2006). Plant Systematics. Elsevier Academic Press, 590 pp.
- CARRION, J. S. (2003) Evolución Vegetal. Ed. Diego Marín. pag. 497
- STRASBURGER, E. NOLL, F., SCHENCK, H & SCHIMPER, A. F. W. (2004). Tratado de Botánica. 35ª edición actualizada. Ed. Omega. Barcelona. 1231 pp
- VARGAS, P. & R. ZARDOYA (Eds.) 2012. El árbol de la vida: sistemática y evolución de los seres vivos. Impulso Global Solutions, S.A. Madrid, 597 pp



Additional

- <http://tolweb.org/tree/> [árbol de la vida]

