VNIVERSITAT DE VALÈNCIA

Course Guide
44304 Geochemistry and environmental palaeontology

COURSE DATA

Data Subject	
Code	44304
Name	Geochemistry and environmental palaeontology
Cycle	Master's degree
ECTS Credits	3.0
Academic year	2022 - 2023

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	4 - Palaeontology applied to the exploration of geological resources and to environmental studies	Optional

Coordination

Name	Department
BASTIDA CUAIRAN, JOAQUIN	200 - Geology

SUMMARY

The subject is aimed at the application of geochemistry and paleontology in the study of environmental problems throughout the geological record, as well as the use of geochemistry in the study and characterization of fossil materials, as well as rocks and geological formations that contain them. The purpose is the integration of paleontological and geochemical data in the analysis of palaeoenvironmental processes, from a local scale to a global scale, at different intervals of the geological record, and in different palaeogeographic settings

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 enrollment restrictions with other subjects in the curriculum. However, it is convenient to have a minimum knowledge of geology, mineralogy and paleontology.

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 be able to integrate knowledge and address the complexity of making informed judgments based on incomplete or limited information, including reflections on the social and ethical responsibilities associated with the application of their knowledge and judgments.
- Students should communicate conclusions and underlying knowledge clearly and unambiguously to both specialized and non-specialized audiences.
- Students should demonstrate self-directed learning skills for continued academic growth.
- Students should possess and understand foundational knowledge that enables original thinking and research in the field.
- Be able to access to information tools in other areas of knowledge and use them properly.
- To be able to assess the need to complete the scientific, historical, language, informatics, literature, ethics, social and human background in general, attending conferences, courses or doing complementary activities, self-assessing the contribution of these activities towards a comprehensive development.
- 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 el razonamiento crítico y la argumentación desde criterios racionales.
- Aplicar la Ciencia desde la óptica social y económica, potenciando la transferencia del conocimiento a la Sociedad.

- Proyectar la inquietud intelectual y fomentar la responsabilidad del propio aprendizaje.
- Asumir el compromiso ético y la sensibilidad hacia los problemas medioambientales, hacia el patrimonio natural y cultural.
- Elaborar de una forma clara y concisa, todo tipo de memorias relacionadas con la temática paleontológica a nivel oficial o profesional (informes, subvenciones, memorias de impactos patrimonial, proyectos de investigación, etc.)
- Desarrollar las habilidades experimentales en el manejo de material y equipos de laboratorio en paleontología.

LEARNING OUTCOMES

Knowledge of fundamnentals for interpretación of geochemical composition of fossils and of rocks and geological formations in which are included, and the corresponding environmental or paleoenvironmental conditions .

Valoration of paleontological and geochemical proxies of for environmental and paleoenvironmental asessment , along with other possible proxies, through relevant examples at local or global scale of the geological record.

DESCRIPTION OF CONTENTS

1. Fundamentals of Geochemistry

Phases and chemical components of geological materials. Geochemical cycle. Isotopic geochemistry. Stable isotopes: environmental applications. Radioactive isotopes: applications in dating. Non-isotopic dating methods. Composition of the atmosphere, hydrosphere, litosphere and biosphere.

2. Paleontology and environment

Using paleontological and geochemical data on environmental issues: environmental aspects. Environmental problems of today. Using paleontology and geochemistry for the study of environmental problems.

3. Fossil record of the environment.

Environmental problems: the fossil record and environmental conditions. Paleoclimatic records. Global changes and cyclicality: contributions from paleontological data. Identification of orbital cycles with paleontological data. Geological periodicity of biotic events. Paleontology and isotope geochemistry.

WORKLOAD

ACTIVITY	Hours	% To be attended
Laboratory practices	18,00	100
Theory classes	10,00	100
Seminars	2,00	100
TOTAL	30,00	

TEACHING METHODOLOGY

The training activity will include 1) lectures; 2) laboratory practices, office and computer room work, or eventually field testing work (simultaneous with field work of another subject) ; 3) personal work, including making individual reports and 4) supervised cooperative work in groups of practices or of seminar, leading to implementation of practical activities as well as development and / or presentation of results.

EVALUATION

Final test 50%

Reports of exercises and practices mandated 20%

Seminars reports 10%

Repports of : bibliographic works or of chapters 20%

REFERENCES

Basic

- MASON B & MOORE C,B (1983) Principles of Geochemistry John Wiley & Sons.
- WHITE W.M (2013) Geochemistry . John Wiley & Sons.
- Condie K C 2011. Earth as an Evolving Planetary System . Academic Press (Elsevier).
- Anguita, F (1988). Origen e historia de la Tierra. Ed. Rueda.
- URIARTE, A (2003) Historia del clima de la Tierra. Vitoria : Eusko Jaurlaritzaren Argitalpen Zerbitu Nagusia.
- Reguant S (2005) Historia de la tierra y de la vida, Ariel.

Additional

- FAIRBRIDGE, RHODES, WHITMORE (1978) The encyclopedia of geochemistry and environmental sciences (Encyclopedia of earth sciences series) Van Nostrand Reinhold Co
- John W. Valley and David R. Cole table Isotope Geochemistry, Reviews in mineralogy and geochemistry series, Volume 43 . Mineralogical Society of America.
- Monroe, J. S., Wicander, R. & Pozo, M.(2008) Geología. Dinámica y evolución de la Tierra.. Ed. Paraninfo-CENCAGE Learning.
- RUDDIMAN, W.F.(2001) Earths climate: past and future. New York, W.H.Freeman.
- Dawson A.G (1992) Ice age earth : late Quaternary geology and climate . Routledge
- WILSON, R.C.L.; DRURY, S.A.; CHAPMAN, J.L.(2000) The great Ice Age. Climate change and life. Routledge, 2000.