COURSE DATA

Data Subject	
Code	43249
Name	Paleodiversity and invertebrate evolution
Cycle	Master's degree
ECTS Credits	3.0
Academic year	2019 - 2020

Study (s)

Degree	Center	Acad. year	Period
2148 - M.D. in Biodiversity: Conservation and Evolution	Faculty of Biological Sciences	1	First term

Subject-matter

Degree	Subject-matter	Character
2148 - M.D. in Biodiversity: Conservation and Evolution	5 - Cross-disciplinary optional subject areas 1	Optional

Coordination

Name	Department
GOZALO GUTIERREZ, RODOLFO	356 - Botany and Geology
PARDO ALONSO, MIGUEL VICENTE	356 - Botany and Geology

SUMMARY

This course is intended to provide an overview of the major events in the history of invertebrates through geological time. They insist on the origins of the groups, large evolutionary radiations and extinctions.

The fossil record provides us with information on both the extinction processes of diversification, and as the weak balance between death and survival will become one of the drivers of change in the biosphere throughout history. Therefore, the subject discloses the information on major extinction events and recovery over geological periods.

The course aims to show students how the fossil record provides information about the evolutionary processes and paleoecological conditions that will develop the invertebrates during the Phanerozoic. Metazoans currently occupy virtually all terrestrial and marine habitats; verification of this fact in the past is contrasted by the fossil record, which provides relevant information on the geographic distribution of registered groups and per both Paleobiogeography. Finally, fossils offer details about the temporal space of different groups of animals distribution were recorded in sedimentary rocks, that allows to know the relative age of various geological materials and their biostratigraphic age and correlation.

The course has a mixed theoretical and practical. Practices include laboratory sessions were devoted to the recognition and description of specimens of different invertebrats that appear in the fossil record and its systematic implications groups.

PREVIOUS KNOWLEDGE

Relationship to other subjects of the same degree

There are no specified enrollment restrictions with other subjects of the curriculum.

OUTCOMES

2148 - M.D. in Biodiversity: Conservation and Evolution

- 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.
- To acquire basic skills to develop laboratory work in biomedical research.
- Be able to make quick and effective decisions in professional or research practice.
- Be able to access the information required (databases, scientific articles, etc.) and to interpret and use it sensibly.
- 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.
- Stimulate the capacity for critical reasoning and for argumentation based on rational criteria.
- Favour intellectual curiosity and encourage responsibility for one's own learning.
- Encourage ethical commitment and environmental awareness.
- Be able to communicate and disseminate scientific ideas.

LEARNING OUTCOMES

- Know the main groups of invertebrates in the fossil record, their way of life, timing and main environments in which they lived and evolved during the Phanerozoic.

- Learning about the major trends occurring in the diversity of invertebrates (extinctions and radiations) and the changes in marine and continental ecosystems through time and use to understand the current organic world.

- Evaluation of the temporal meaning and / or ecological from each group and its use in dating rocks and paleoenvironmental interpretation of sedimentary environments. Emphasizing some characteristic fossils of successive geological ages and different paleoecological contexts, allowing characterize some of the major milestones in the history of life on Earth

- Learning the use of fossil record indicator invertebrates as different scale climatic changes.

WORKLOAD

ACTIVITY	Hours	% To be attended
Theory classes	20,00	100
Laboratory practices	10,00	100
Development of individual work	8,00	0
Preparation of evaluation activities	16,00	0
Preparing lectures	16,00	0
Preparation of practical classes and problem	5,00	0
TOTAL	**75,00**	

TEACHING METHODOLOGY

English version is not available

EVALUATION

English version is not available

REFERENCES

Basic

- Benton, M.J. & Harper, D.A.T. 2009. Introduction to Paleobiology and the fossil record. Wiley-Blackwell, 592 pp.
- Boardman, R. S., Cheetham, A. H. & Rowell, A. J. (eds.) 1987. Fossil Invertebrates. Blackwell scientific Publications, 713 pp.
- Camacho, H.H. & Longobucco, M.I. 2008. Los invertebrados fósiles. Fundación de Historia Natural

Félix de Azara Vázquez Mazzini Editores, Buenos Aires, 2 volúmenes, VI+785 pp.
- Clarkson, E.N.K. 1986. Paleontología de Invertebrados y su evolución. Ed. Paraninfo, Madrid, 357 pp.
- Clarkson, E.N.K. 1998. Invertebrate Palaeontology and Evolution. Fourth Edition. Blackwell Science Ltd., 452 pp.
- Doyle, P. 1996. Understanding Fossils. An Introduction to Invertebrate Palaeontology. John Wiley & Sons, 409 pp.
- Martínez Chacón, M.L. & Rivas, P. (Eds.) 2009. Paleontología de Invertebrados. Sociedad Española de Paleontología-Instituto Geológico y Minero de España-Universidad de Oviedo, 524 pp.
- Stearn, C.W. & Carroll, R.L. 1989. Paleontology: the record of life. John Wiley & Sons, Inc., 453 pp.
- Stanley, S.M. 1989. Earth and life through time, 2ª ed. W.H. Freeman and company, Nueva York, 689 pp.
- Stanley, S.M. 2009. Earth System History. Third Edition. W.H. Freeman & Company, New York, 551 pp.
- Treatise on Invertebrate Paleontology. Geological Society of America and University of Kansas Press

Additional

- Brenchley, P.J. & Harper, D.A.T. 1998. Palaeoecology: Ecosystems, environments and evolution. Chapman & Hall, 402 pp.
- Doménech, R. & Martinell, J. (1996). Introducción a los fósiles. Masson, Barcelona 252 pp.
- Fedonkin, M.A., Gehling, J.G., Grey, K., Narbonne, G. M. & Vickers-Rich, P. 2007. The Rise of Animals. Evolution and diversification of the Kingdom Animalia. The Johns Hopkins University Press, Baltimore, 327 pp.
- Lipps, J. H. & Signor, P. W. (eds) 1992. Origin and Early Evolution of the Metazoa. Plenum Press, New York, 570 pp.
- Tasch, P. 1980. Paleobiology of the invertebrates. 2nd edition. John Wiley and Sons, 975 pp.
- Valentine, J.W. 2004. On the Origin of Phyla. University of Chicago Press, Chicago, 614 pp.
- Vargas, P. & Zardoya, R. 2012. El Árbol de la Vida: Sistemática y evolución de los seres vivos. Madrid, 597 pp.

ADDENDUM COVID-19

This addendum will only be activated if the health situation requires so and with the prior agreement of the Governing Council

English version is not available