UAB Universitat Autônoma de Barcelona

Continental Paleobiology

Code: 44792 ECTS Credits: 15

	ECTS Credits: 15		2024/2025
Degree		Туре	Year
4318288 Paleobiology and Fossil Re	cord	OB	0
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Teaching groups languages

You can view this information at the <u>end</u> of this document.

Prerequisites

As for the rest of subjects.

Objectives and Contextualisation

Learning:

- Identify the main fossil groups of continental vascular plants, invertebrates and vertebrates.
- Recognize the evolution of continental biotas using the fossil record.
- Recognize the advanced methods and techniques for morfological, phylogenetic and macroevolutionary analysis of fossil floras and faunas.

Skills:

- Apply the fossil record of contiental plants, invertebrates and vertebrates to solve research questions in evolution, paleoclimatology and biostratigraphy in terrestrial settings.
- Assemble the information derived from the study of multiple groups of continental fossils to solve a case study in paleoenvironmental reconstruction.
- Comunicate the adquired knowledge on continental fossils to a non-specialized audience.

Competences:

- Demonstrate ability for autonomous research of information to ellaborate an explanation related to continental paleobiology.
- Share knowledgement and critical evaluate individual and collective decissions in a context of team work to write a scientific paper on vertebrate evolution, reducing gender and sex inequalities.

Learning Outcomes

- 1. CA07 (Competence) Demonstrate the capacity to independently acquire information in order to develop an explanation related to continental palaeobiology.
- 2. CA08 (Competence) Share knowledge and critically assess individual and collective decisions in a teamwork context in order to draft a scientific article on the evolution of vertebrates, in doing so reducing inequalities based on sex and gender.
- 3. CA08 (Competence) Share knowledge and critically assess individual and collective decisions in a teamwork context in order to draft a scientific article on the evolution of vertebrates, in doing so reducing inequalities based on sex and gender.
- KA05 (Knowledge) Identify the main groups of fossilised continental vascular plants, invertebrates and vertebrates.
- 5. KA06 (Knowledge) Recognise the evolution of continental biotas from the fossil record.
- 6. KA07 (Knowledge) Recognise advanced methods and techniques in morphological, phylogenetic and macroevolutionary analysis of fossilised fauna and flora.
- 7. SA07 (Skill) Apply the fossil record of continental plants, invertebrates and vertebrates to solve problems related with evolution, palaeoclimatology and biostratigraphy in the terrestrial environment.
- 8. SA08 (Skill) Integrate the information provided by the different groups of continental fossils to solve a palaeoenvironmental reconstruction case study.
- 9. SA09 (Skill) Disseminate the knowledge acquired from the study of continental fossils to a non-specialist audience.

Content

1. Evolution of plants. Origin and evolution of the terrestrial plants from the Ordovician to the present. Main phases of the terrestrial plant evolution: colonization of continents, origin of vascular plants, origin and radiation of seed plants, origin and radiation of flowering plants. Implementation of fossil plants in palaeoclimatic and palaeoenvironmental reconstructions of ancient terrestrial ecosystems.

2. Continental invertebrates. Evolution, phylogeny and palaeobiology of terrestrial invertebrates, mainly arthropods and molluscs from the late Palaeozoic. Plant-insect interaction and coevolution.

3. Palaeobiology and evolution of tetrapods. Origin and evolution of the tetrapods since the Devonian including the colonization of terrestrial habitats and the radiation and evolution of amniotes. Origin, evolution, and palaeobiology of reptiles, parareptiles, and eureptiles as well as of the first flying vertebrates (pterosaurs) and dinosaurs (including the origin of feathers and flight in birds). Herpetological biodiversity of the Cenozoic and Quaternary.

4. Palaeobiology and evolution of mammals. Origin, evolution, and palaeobiology of mammals, emphasizing the main groups of micromammals (rodents) and macromammals (carnivorans, artiodactyls, perissodactyls, etc). Mammals biodiversity, evolution and palaeobiology. Chronology and paleoclimatic context of mammalian evolution during the Cenozoic. The mammal faunas from the Neogene and Quaternary. Evolution of mammals under insularity conditions. The role of Dorotea Bate.

5. Fossil primates and human evolution. Origin and adaptations of archaic and modern primates. Divergence between the Strepsirhini and Haplorhini, origin and radiation of the anthropoids, palaeobiodiversity and palaeobiology (locomotion, diet and cognition) of the hominoids. Eocene primates of the Iberian Peninsula and fossil catarrhines from the Miocene of Catalonia. Human evolution: first hominins, australopithecines, origin and diversity of the genus *Homo*.

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Live broadcasting of lectures using ITC	98	3.92	
Type: Supervised			
Carrying out exercises of analysis and reading papers related to continental paleobiology individually, and subsequent group discussion	42	1.68	
Exercises on study cases individually or in group	42	1.68	
Monitoring or consult tutorials	13	0.52	
Type: Autonomous			
Individual study	180	7.2	

The subject is organized in hybrid lectures 2 hour long each one. The lecutures consist of activities of supervised, directed and autonomous teaching, which will be based in the following methods

- Live broadcasting of lectures using ITC. These lectures will consist in the theoretical concepts related with the five main content blocks (List of topics)
- Carrying out exercises of analysis and reading papers related to continental paleobiology individually, and subsequent group discussion using Microsoft Teams.
- Exercises on study cases individually or in group using Microsoft Teams.
- Monitoring or consult tutorials using Microsoft Teams.
- Individual study.

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Assessment

Continous Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Activities and exercises	20 %	0	0	CA08, SA07, SA08, SA09
Attendance and active participation in class	10 %	0	0	KA05, KA06, KA07, SA09
Delivery of reports/works	30 %	0	0	CA07, CA08, SA07, SA08, SA09
Theory exams/synthesis	40 %	0	0	CA07, KA05, KA06, KA07, SA07

Evaluation will consist of the following methods:

- Attendance and active participation at class: 10%
- Activities and exercises: 20%
- Delivery of reports/works: 30%
- Theory exams/syntheses: 40%

Bibliography

- Agustí, J., Antón, M., 2002. *Mammoths, sabertooths, and hominids: 65 million years of mammalian evolution in Europe.* Columbia University Press, 313 pp.
- Begun, D. R. (Ed.). 2012. A companion to paleoanthropology. John Wiley & Sons, 648 pp.
- Behrensmeyer, A.K.K., Damuth, J.D., DiMichele, W.A., Potts, R., Sues, H.-D., Wing, S.L. (Eds.), 1992. Terrestrial ecosystems through time: Evolutionary paleoecology of terrestrial plants and animals. University of Chicago Press, 588 pp.
- Benton, M.J. 2015. Vertebrate Paleontology, 4th Edition. Wiley-Blackwell, 480 pp.
- Brusatte, S.L. 2012. Dinosaur Paleobiology. Wiley-Balckwell, 352 pp.
- Blois, J.L., Hadly, E.A., 2009. Mammalian response to Cenozoic climatic change. *Annual Review of Earth and Planetary Sciences* 37, 181-208.
- Carroll, R.L., 1988. Vertebrate Paleontology and Evolution. W. H. Freeman and Company, 698 pp.
- Clack, J.A. 2012. *Gaining Ground. The Origin and Evolution of Tetrapods*, 2nd volume. Indiana University Press, 544 pp.
- Fleagle, J.G., 2013. *Primate Adaptation and Evolution*, 3 Edition. Academic Press, 464 pp.
- Grimaldi, D., Engel, M.S. 2005. Evolution of the Insects. Cambridge University Press, 755 pp.
- Hartwig, W. C. (Ed.). 2002. The primate fossil record. Cambridge University Press, 552 pp.

- Kemp, T.S., 2005. The Origin and Evolution of Mammals. Oxford University Press, 331 pp.
- Lewin, R., Foley, R.A., 2004. Principles of Human Evolution, 2nd Edition. Blackwell Science, 555 pp.
- Martinetto, E., Tschopp, E., Gastaldo, R.A., 2020. Nature Through Time. Springer Nature, 462 pp.
- Mc Elwain, J., 2018. Paleobotany and Global Change: Important Lessons for Species to Biomes from Vegetation Responses to Past Global Change. Annual Reviews Plant Biology, 69:761-787.
- Palkovacs, E.P. 2003. Explaining adaptive shifts in body size on islands: a life history approach. *Oikos* 103, 37-44.
- Prothero, D.R., 2006. After the dinosaurs: The age of mammals. Indiana University Press, 384 pp.
- Rose, K.D., 2006. The beginning of the Age of Mammals. Johns Hopkins University Press, 448 pp.
- Smith, F.A., 2021. Mammalian paleoecology: Using the past to sutyd the present. Johns Hopkins University Press, 274 pp.
- Strömberg, C.A.E., 2011. Evolution of grasses and grassland ecosystems. *Annual Review of Earth and Planetary Sciences* 39, 517-544.
- Taylor, T., Taylor, E., Krings, M., 2009. *Paleobotany: The Biology and Evolution of Fossil Plants*, 2nd Edition. Academic Press, 1252 pp.
- Van der Geer, A., Lyras, G., de Vos, J. 2021. *Evolution of Island Mammals: Adaptation and extinction of Placental Mammals on Islands*, 2nd Edition. John Wiley & Sons Ltd, 576 pp.
- Vaughan, T.A., Ryan, J.M., Czaplewski, N.J., 2013. *Mammalogy*, 6th Edition. Jones & Barlett Learning, 756 pp.
- Willis, K.J., Mc Elwain, J.C., 2002. The Evolution of Plants. Oxford University Press, 378 pp.

Software

No specific softwae is required, just the use of ICT tools such as Microsoft Teams.

Language list

Name	Group	Language	Semester	Turn
(TEm) Theory (master)	1	Spanish	first semester	afternoon