Universitat Autònoma de Barcelona

2021/2022

Planet Earth

Code: 106222
ECTS Credits: 6

Degree	Type	Year	Semester
2504235 Science, Technology and Humanities	FB	1	2

The proposed teaching and assessment methodology that appear in the guide may be subject to changes as a result of the restrictions to face-to-face class attendance imposed by the health authorities.

Contact

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Use of Languages

Principal working language: spanish (spa)
Some groups entirely in English: No
Some groups entirely in Catalan: No
Some groups entirely in Spanish: Yes

Other comments on languages

An important part of the recommended bibliography is in English

Prerequisites

Basic notions about the aspects of Science for the Contemporary World, especially on the origin and constitution of the Universe and the Earth, the human intervention on natural systems and the environment and the sustainable development.

English language: suitable level to access the comprehension of basic or informative scientific texts or books.

Objectives and Contextualisation

Understand the fundamental aspects of:

- The Earth as a system and the interactions that occur between its parts: Solid Earth, Hydrosphere, Atmosphere and Biosphere.

- The origin and evolution of the Universe, the formation of the Earth and its early evolution.

- The solid Earth and its internal structure.

- Geological Materials: Minerals, rocks and geological structures.

- Geological Time.

- The global terrestrial dynamics: Plate Tectonics.

- Atmosphere, Hydrosphere, its interactions and the climate systems.

- Mineral and energy resources

Competences

- Relate terrestrial dynamics and the variable of time in the terrestrial, atmospheric and climatic processes, and identify the problems generated by use of natural resources on the part of humans.
- Students must have and understand knowledge of an area of study built on the basis of general secondary education, and while it relies on some advanced textbooks it also includes some aspects coming from the forefront of its field of study.

Learning Outcomes

1. Discern the interactions between the various layers or spheres of the planet and relate the geodynamic significance of the structural processes, within the framework of plate tectonics.
2. Display understanding of the fundamental principles of geology and the ability to identify the basic types of minerals, rocks and structures.
3. Display understanding of the fundamentals of geology, and the spatial and temporal dimensions of terrestrial processes.
4. Identify the geological terrestrial resources and how they relate to the environment.
5. Recognise the fundamental aspects of the Earth as a dynamic system.

Content

1 - The Universe, the Solar System and the Planet Earth.

The beginnings of the Universe. Its structure. Galaxies. Stars. The Solar System. Evolution of the early Earth.

2 - The Earth: composition and structure.

Sources of information and methods of study on the composition and internal structure of the Earth. Fundamental properties of the Earth's Crust, Mantle and Core. Fundamental properties of the Hydrosphere, the Atmosphere and the Magnetosphere.

3. - Geological materials.

Minerals. Rocks. Geological structures.

4 - Geological time.

Relative ages. Absolute ages. Calibration of the geological timescale. Main events in the History of the Earth.

5 - Terrestrial Dynamics and Plate Tectonics.

Continental drift. Plate Tectonics. Types of plate boundaries and associated phenomena. The movements of plates and their origin. The Wilson's cycle.

6 - Atmosphere, Hydrosphere and its interactions.

The Atmosphere: Composition, origin and evolution. Structure. Temperature, pressure and humidity. Energetic balance. Meteorology: conditions for atmospheric weather. Global and local dynamics of air masses. The Hydrosphere: Distribution of water bodies. Ocean dynamics. Atmosphere-Hidrosphere interactions.

7. - Climate and climate change

Main mechanisms: changes in incident radiation, changes due to terrestrial dynamics, changes in the atmospheric composition of natural and anthropogenic origin. The carbon cycle.

8 - The search for Energy and Resources.

Fossil and sustainable energy resources. Mineral resources: prospecting, exploitation and uses of metal and industrial minerals.

Methodology

Theory:

- Magister classes

Classroom practices (PAUL):

- Seismology I. Seismic Waves. Epicentre and magnitude of the earthquakes. Construction of a time-distance scale and evaluation of the epicentre and magnitude of an earthquake.

- Seismology II. Spatial and temporal distribution of seismicity on Earth. Information and seismicity data pools. Seismic software. Seismology related to volcanic activity: the example of the El Hierro eruption. Evolution of seismicity during a major earthquake.

- Geological time I: Examples of help for the understanding of the spatial and temporal dimension of the History of the Earth.

- Geological time II: Preparation of geological time scales with the main events of the History of the Earth

- Carbon Cycle on Earth: Models of the recent Carbon cycle.

- Seminars / additional/alternative exercises:

Characterization of plate boundaries at the structural level and from volcanism, plate tectonics or palaeogeography.

Calculations on parameters of the Atmosphere and/or Hydrosphere.

El Niño: an example of atmosphere-ocean interaction phenomena, with climatic implications.

* According to the teacher giving each seminar, this may involve the mandatory presentation of a dossier or work, which can be evaluated in the manner established by the teacher.

Note: Teachers will have to spend about 15 minutes of a class to allow students to respond to assessment surveys of teaching and subject performance.

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.

Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Practicals (PAUL)	16	0.64	2, 3, 1, 4, 5
Theory	33	1.32	2, 3, 1, 4, 5
Type: Autonomous			
Personal work	93	3.72	2, 3, 1, 4, 5

Assessment

Continuous assessment (CA):

2 partial exams (which will include theory and seminar contents. Each exam will score on 10 pt.

1st partial exam: Theory topics + Seminars = 40 % total note AC

2nd partial exam: Theory topics + Seminars = 40% total note AC

The student who presents to a partial exam will not have right to score: Non assessable, since the score associated with each of the partials (50%), is always greater than 30% of the total continuous assessment.

You have to present all the Works / Dossiers on the seminars proposed as mandatory by the professors. The score on each will be: Very Good-10, Good-7, Normal-5, Incorrect-3, Very incorrect or not delivered-0. The average grade will be calculated and it will weight 0.2 (20%). If there are two dossiers or works not submitted, this part of the assessment will be lost (20%). The dossiers or works must be delivered on the dates fixed by the teachers (non-submission before de deadlines imply a score of non-delivered = 0). The non-delivered works / dossiers will not be recoverable in any case after the deadline for presentation. This deadlines which in any case be prior to the date of the second partial exam.

Score CA = Score partial exam 1 x 0,4 + Score partial exam2 x 0,4 + Score works/dossiers x 0,2

To pass the subject (passed) by continuous assessment, the CA grade must be equal to or greater than 5 and the scores of each partial exam must be greater than, or equal to 3. Grades less than 3 in a partial exam will prevent calculating the CA score (score will be Non assessable) and the student must submit to the corresponding part of the final exam.

Final exam:

The final exam will consist of two parts:

1: Reassessment of the first partial exam (theory and seminars) and

2: Reassessment of the second partial exam (theory and seminars).

In the event that a lower score is obtained than that obtained in the corresponding partial exam that is being reassessed, the arithmetic mean of the two scores will be made.

If, in either of the two theory tests the score is still less than 3, the final grade will be failed. In this last case if the computation of the note is greater than 5 the numerical score will be reduced 4.9 and the final score will be Fail).

Students who wish to take one or two parts of the final exam to improve their scores must notify to teachers in advance on which part/s they want to be reassessed (i.e. first partial, second partial or both). The teacher will implement a list with a deadline for registration for this final exam. If the teachers does not have any notice from the students within the stipulated limit, the access to this final exam may not allowed to and the student will lose the right to improve the grade of the corresponding part of which he has not notified in advance.

Under no circumstances will students not presented to one or both partial exams and not presented at the corresponding reassessment, or those not presented to the final exam and having the obligation to submit it, will be entitled to a new final reassessment exam aside from the final exam. If a student has not submitted to a partial or to the final exams due ofamajor cause, then he will have to documentary justify the event to the teachers. If this document is considered sufficient by the teacher, the student will have to recover the part not examined within the final exam and if it does not pass it, then the student will be able to repeat this part on a date set by the teacher (the only exception that allows an additional reassessment after the final exam).

Final Score:

The formula of calculation of the final score will be:

Final Score = (Theory test score + seminars 1st partial x 0.4) + (Theory test score + seminars 2nd partial x 0.4) + score on works / dossiers x 0,2

If the final score is ≥ 4.8 and the works / exercises / dossiers requested have been submmited (no more than two non submmited) and if the average qualification of these works / exercises / dossiers is ≥ 5 the score can be increased up to 5 and the subject can be passed. Under no circumstances may the subject be passed with grades equal or less than 4.8 and with two works / exercises / dosiers not presented.

All exams will contain an objective test-style part with multiple answer type questions (correct answered option: 1 pt, unanswered option: 0 pt, incorrect answered option: -0,25 pt) and a part with answer/development short questions.

At the time of carrying out each assessment activity or alternatively at the time of publishing the grades (1er, 2nd partial exams and final exam), the teacher will report to students (Moodle) the procedure and the date of review of the grades.

Students will obtaina"Not assessed/Not submitted" coursegrade unless they have submitted more than 30% of the assessment items.

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Exercices, problems or assignements	20%	4	0.16	2, 3, 1, 4, 5
Partial Exam 2	40%	2	0.08	2, 3, 1, 4, 5
Partial Test 1	40%	2	0.08	2, 3, 1, 4, 5

Bibliography

An Introduction to Our Dynamic Planet. Nick Rogers. Cambridge University Press ISBN: 9780521494243, 2007-2008.

Planet Earth : Cosmology, Geology, and the Evolution of Life and Environment. Cesare Emiliani, Cambridge University Press ISBN: 9780521409490, 1992-1997.

Ciencias de la Tierra: Una introducción a la geología física. Tarbuck, Edward J., Madrid [etc.] : Prentice Hall, cop. 2000. Capítulo 2: Tectónica de placas: el desarrollo de una revolución científica. 33-75.

Meteorology Today: an introduction to weather, climate, and the environment. Ahrens, C. Donald, Pacific Grove, CA : Thomson/Brooks/Cole, cop. 2007.

Geografía Física. Strahler, Arthur. Editorial Omega, Barcelona. ISBN: 84-282-0770-4. 1992, 629 pag.

Origen e Historia de la Tierra. Francisco Anguita Virella, Editorial Rueda, Madrid. ISBN: 8472070522 ISBN-13: 9788472070523, 1ª ed. edición (09/1988), 445 pags.

Understanding the Earth. Grotzinger, J. and Jordan, T., 2010. 6th. Ed. W. H. Freeman & Co., NY.

Earth and Life. The Dynamic Earth. S269 DE Science: a secon level course. S269 Course Team. The Open University. 1997.

The Blue Planet. An Introduction to Earth Sistem Science. Brian J. Skinner, Stephen C. Porter and Daniel B. Botkin., 1999. 2nd. Ed. John Wiley & Sons, Inc.

Digital Resources:

Climate Change: Oberved Impacts on Planet Earth. T.M. Letcher. *Elsevier Science Limited. https://www.sciencedirect.com/book/9780444533012/climate-change*

Ciencias de la Tierra: Una introducción a la geología física. Tarbuck, Edward J., Madrid [etc.] : Prentice Hall, cop. 2000. Capítulo 2: Tectónica de placas: el desarrollo de una revolución científica. 33-75. https://elibro.net/es/ereader/uab/107543

* *During the semester multiple accesses to digital contents are provided through links inserted on the contents provided trouth the Virtual Campus of the subject.*

Software

Google Earth

Excel