

Degree	Type	Year
2500254 Geology	OB	3

## Contact

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## Teachers

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## Teaching groups languages

You can view this information at the [end](#) of this document.

## Prerequisites

Since it is a subject that involves the observation of different types of rocks and structures in the field and its analysis in a broad geodynamic context, it is necessary that the student be able to:

- recognize the different types of sedimentary rocks and their significance
- recognize metamorphic and plutonic rocks and relate them to structural and petrogenetic processes,
- recognize and interpret geological structures and perform data collection
- interpret geological maps.

Therefore, it is recommended that the student has passed the second year subjects (or third year of double degree) and is taking (or has taken) the rest of the compulsory third year subjects (or fourth year double degree)

## Objectives and Contextualisation

The goal is to study on the field the geology of the Variscan Iberian Massif observing the different lithologies and structural styles, and deducing the tectonic and petrological processes that took place during the orogeny. To this end, an E-W cross-section will be made along the NW of the Iberian Peninsula, from the external to the internal parts of the orogen. This geotraverse is one of the most complete examples of an ancient orogen and constitutes a model of international interest.

## Competences

- Display understanding of the size of the space and time dimensions of Earth processes, on different scales.
- Draw up and interpret geological maps and other means of depicting geological information (columns, correlation frames, geological cross-sections, etc.)
- Identify and characterise minerals and rocks through instrumental techniques, determine their formation environments and know their industrial applications.
- Learn and apply the knowledge acquired, and use it to solve problems.
- Obtain information from texts written in other languages.
- Process, interpret and present field data using qualitative and quantitative techniques, and suitable computer programmes.
- Recognise, depict and reconstruct tectonic structures and the processes that generate them and relate types of rocks and structures to geodynamic environments.
- Show initiative and adapt to problems and new situations.
- Suitably transmit information, verbally, graphically and in writing, using modern information and communication technologies.
- Synthesise and analyse information critically.
- Work in different environments and localisations, with respect for diversity and multiculturalism.
- Work in teams, developing the social skills needed for this.

## Learning Outcomes

1. Analyse tectonic structures in the field from a geometric point.
2. Discern the endogenous and exogenous processes related to the evolution of a geological unit.
3. Establish temporal relationships between the different structures of a region.
4. Identify on the ground markers of the formation processes of minerals and rocks and establish their temporal relationships.
5. Identify on the ground the different types of tectonic structures, the temporal relationships between them and their significance.
6. Integrate outcrop-scale observations to make a regional-scale interpretation.
7. Interpret the physical conditions of their formation based on field criteria.
8. Interpret the structure of a region in a geodynamic context.
9. Learn and apply the knowledge acquired, and use it to solve problems.
10. Obtain information from texts written in other languages.
11. Obtain, process and interpret field data from a regional, multidisciplinary perspective.
12. Recognise in the field the different types of rocks and relate them to the processes that originated them.
13. Show initiative and adapt to problems and new situations.
14. Suitably transmit information, verbally, graphically and in writing, using modern information and communication technologies.
15. Synthesise and analyse information critically.
16. Synthesise field data to present regional-scale findings.
17. Work in different environments and localisations, with respect for diversity and multiculturalism.
18. Work in teams, developing the social skills needed for this.

## Content

### THEORY

The Variscan Iberian Massif, its zoning and structure. Metamorphism and igneous rocks of the Variscan Iberian Massif.

Evolution of metamorphism. Age and characteristics of magmatism. Evolution of the Iberian Variscan orogen.

#### SEMINARS

- Seminar on Stratigraphy and Paleontology of the region.
- Seminar on Geological Resources of economic interest.

#### FIELD WORK

I. The Cantabrian Zone: the stratigraphic succession, structure of the Esla nappe, structure of Picos de Europa; resources of economic interest. Age of deformation.

II- The West-Asturian-Leonese Zone: stratigraphic succession, structure, metamorphism and plutonism:

- The Navia and Alto Sil Domain.
- *The structure of the Mondoñedo nappe.*
- *The "Ollo de Sapo".*

III- The Galicia-Trás-os-Montes zone:

- *The Cape Ortegal massif.* Lithology, structure, ages of rocks and geotectonic meaning.

### Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Guided field work	42	1.68	1, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18
Seminar on Stratigraphy and Paleontology of the region	5	0.2	3, 6, 9, 10, 14, 15
Seminar on geological resources of economic interest	5	0.2	2, 3, 9, 10, 14, 15
Theory	5	0.2	2, 3, 8, 9, 10, 14, 15
Type: Supervised			
Evaluation during fieldwork	12	0.48	1, 3, 4, 5, 6, 11, 12, 13, 16, 17, 18
Examination on the fieldwork contents	4	0.16	2, 3, 6, 7, 8, 9, 11, 13, 14, 15, 16
Pre-departure test on the evolution of the Northern branch of the Variscan Iberian Massif	2	0.08	2, 3, 8, 9, 10, 14, 15
Type: Autonomous			
Reading of bibliography and interpretation of maps	52	2.08	2, 9, 10, 15

#### Theory:

- The Variscan Massif of the Iberian Peninsula, its zonation and structure (2 h).

- Variscan metamorphism and magmatism. Evolution of metamorphism. Age and characteristics of the magmatism (1 h). Evolution of the Iberian Variscan Orogen (1 h).

#### Seminars:

- The Stratigraphy and Palaeontology of the region (4 h-1.5 h evaluation of the seminar)
- Geological resources of economic interest (4 h-1.5 h evaluation of the seminar)

#### Fieldwork:

6 field work days doing a transect of the Varian Massif of the NW of the Iberian Peninsula from the external to the internal zones. Before the field trip, the student will take a previous test on the theoretical classes taught. During the fieldwork, emphasis will be placed on the preparation of a field notebook in which the student will collect information on the outcrops or structures that are visited. The student must be interested in keeping the notebook up to date, as it will be a basic element in the evaluation. Several tests will be carried out to evaluate the work done during the field trip. The presentation of the field notebook (or exercises to be carried out not included in the field notebook) may be required to evaluate the students during the development of the field trip. On the last day of the field trip, an evaluation of the entire content of the fieldwork will be done.

Teachers will spend approximately 15 minutes after the field trip to allow their students to answer the surveys for the evaluation of teaching performance and evaluation of the subject.

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
Evaluation of daily work in the field (daily tests + field notebook + exercises)	30%	12	0.48	1, 2, 3, 4, 5, 6, 7, 8, 9, 11, 12, 13, 14, 17, 18
Final examination of the fieldwork	30%	4	0.16	2, 3, 6, 7, 8, 9, 13, 14, 15, 16
Pre-departure test on the evolution of the Northern branch of the Iberian Variscan Massif	10%	4	0.16	3, 9, 10, 14, 15
Seminar on Stratigraphy and Paleontology of the studied region	15%	1.5	0.06	9, 10, 14, 15, 18
Seminar on geological resources of economic interest	15%	1.5	0.06	9, 10, 14, 15, 18

#### Degree of compulsory presential teaching

In order for a student to be evaluated, he / she must meet the following minimum requirements:

- Have attended the field every day
- Have attended, at least, 80% of the theoretical sessions
- Have attended, at least, 80% of the seminars.

Assessment system for the acquisition of skills and qualification system:

- Evaluation of the Seminar on Geological Resources of Economic Interest 15%
- Evaluation of the Seminar on Stratigraphy and Paleontology of the region 15%
- Exam taken before departure to the field 10%

- *Evaluation of field work:*

Evaluation of daily work in the field (daily tests + field notebook + exercises) 30%

Final exam on the contents of the fieldwork 30%

All exams and the test before departure are required. The non-achievement of some of them prevents to pass the subject.

When the score of some of the Seminars or the score of the final Exam on the fieldwork contents is less than 3,5 points, a retake exam will be compulsory.

The students will be allowed to make a retake exam on seminars or the final exam on the contents of the fieldwork items only

Achieve a grade lower than 3.5 points in the retake exam of any of the items prevents to approve the subject.

If a student has carried out evaluation activities exceeding 35% of the total of the subject content, she / he will be graded as FAILED and he /she will be not allowed to be qualified as Unassessable.

SINGLE ASSESSMENT:

This subject does not incorporate single assessment

## **Bibliography**

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COMBA, J.A. 1983. Libro Jubilar J.M. Ríos Geología de España. IGME, Madrid, 656 pp.

GIBBONS W. & MORENO, T. (Eds.) (2002). *The Geology of Spain*. The Geological Society, London. 649 pp.

FOSSEN, H. 2010. *Structural Geology*. Cambridge University Press. Edimburg. 463 pp.

HATCHER, R.D. 1990. *Structural Geology*. Merrill Publishing Co. Columbus. 531 pp.

HOBBS, B.E., Means, W.D. & Williams P.F. 1981. *Geología Estructural*. Omega. Barcelona. 518 pp.

VAN DER PLUIGM, B.A. & MARSHAC. J, S. 1997. *Earth Structure, An introduction to Structural Geology and Tectonics*. WCB/McGraw-Hill. 495 pp.

VERA, J.A. (Ed.) 2004. *Geología de España*. SGE-IGME. Madrid, 890 pp. ISBN: 847840-546-1.

The course's Virtual campus provides several additional links to electronic learning resources.

## **Software**

Acces to Google Earth

## Language list

Name	Group	Language	Semester	Turn
(PCAM) Field practices	1	Catalan	second semester	morning-mixed
(PCAM) Field practices	2	Catalan	second semester	morning-mixed
(PCAM) Field practices	3	Catalan	second semester	morning-mixed
(PCAM) Field practices	4	Catalan	second semester	morning-mixed
(SEM) Seminars	1	Catalan	second semester	morning-mixed
(SEM) Seminars	2	Catalan	second semester	morning-mixed
(SEM) Seminars	3	Catalan	second semester	morning-mixed
(SEM) Seminars	4	Catalan	second semester	morning-mixed
(TE) Theory	1	Catalan	second semester	morning-mixed

PROVISIO