UAB
Universitat Autònoma de Barcelona

Structural Geology II

Code: 101046
ECTS Credits: 6

2025/2026

Degree	Type	Year
Geology	OB	3

Contact

Name: Elena Druguet Tantiña

Email: elena.druguet@uab.cat

Teachers

Elena Druguet Tantiña

Eduard Saura Parramon

Teaching groups languages

You can view this information at the end of this document.

Prerequisites

To have passed the subjects "Fundamentals of Geology" and "Field work on Regional Geology" of the first course of the Degree of Geology and of first and second year respectively of the double degree in Environmental Sciences and Geology.

Objectives and Contextualisation

To recognize, identify and interpret ductile deformation structures and their association in different tectonic contexts. This will be done both from a theoretical (genesis of structures) and analytical point of view (real structures). Emphasis will be placed on the student's acquisition of the ability to use the appropriate terminology of structural geology and the acquisition of skills to represent the structural characteristics throughout different methods of graphic representation (maps, cross-sections, detail schemes, stereographic projection and other specific techniques).

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.)
- Learn and apply the knowledge acquired, and use it to solve problems.
- 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.
- Suitably transmit information, verbally, graphically and in writing, using modern information and communication technologies.
- Synthesise and analyse information critically.
- Use concepts from physics when solving problems in geology.
- Work independently.

Learning Outcomes

1. Discern the deformation processes on different scales.
2. Draw up geological maps of structurally complex regions and geological cross-sections.
3. Draw up structural subsoil models, based on geological cross-sections and three-dimensional block diagrams.
4. Formulate and verify hypotheses of a structural and tectonic nature.
5. Interpret the mechanical behaviour of geological materials in accordance with physical parameters.
6. Learn and apply the knowledge acquired, and use it to solve problems.
7. Process, interpret and present structural data.
8. Recognise and depict the principal tectonic structures.
9. Relate deformation structures to tectonic stress.
10. Relate the principal tectonic structures to structural and petrogenetic processes.
11. Suitably transmit information, verbally, graphically and in writing, using modern information and communication technologies.
12. Synthesise and analyse information critically.
13. Work independently.

Content

BLOCK 1

Topic 1: REVIEW OF CONCEPTS. CONTINUOUS DEFORMATION

Topic 2: HOMOGENEOUS DEFORMATION IN 2D

Topic 3: 2D HETEROGENIC DEFORMATION

Topic 4: DETERMINATION OF STRAIN IN 2D

Topic 5: DEFORMATION IN 3D

BLOCK 2

Topic 6: GEOLOGICAL IMPLICATIONS OF DEFORMATION

Topic 7: FOLIATIONS AND LINEATIONS

Topic 8: FOLDS

Topic 9: FOLDING

Topic 10: BOUDINAGE STRUCTURES

Topic 11: SUPERPOSITION STRUCTURES

Topic 12: SHEAR ZONES

Topic 13: MILONITES AND RELATED STRUCTURES. KINEMATIC INDICATORS

BLOCK 3

Topic 14: TECTONIC REGIMES AND DEFORMATION PARTITIONING. INTERNAL DOMAINS OF THE OROGENS

CLASSROOM PRACTICES

Practice 1: Homogeneous deformation through coordinate transformation equations

Practice 2: The Mohr circle for finite homogeneous deformation

Practice 3: Homogeneous deformation in 2D

Practice 4: Heterogeneous deformation in 2D

Practice 5: Methods for determination of deformation: (1) Rf / Φ, (2) Method of Fry

Practice 6: Geological cutting through a strip of folds with cleavage

Practice 7: Folds in stereographic projection and Fleuty classification

Practice 8: Morphology of folds and classification of Ramsay

Practice 9: Polyphase deformation

Practice 10: Shear zones

Practices 11-12: Review of deformation structures

FIELD PRACTICES

Tectonic structures in Cap de Creus (2 field trip days)

-First day: Cadaqués-Guillola-Mas de Rabassers. Recognition and elaboration of cross-sections and structural schemes of zones with folds and associated foliations.

- Second day: Puig Culip - Culleró. Recognition and detail mapping of areas with folds and associated foliations in domains of intense metamorphism and magmatic activity. Relationships tectonics/metamorphism/magmatism. Shear zones.

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Classroom exercises	12	0.48	2, 7

Field practices (field excursions)	14	0.56	1, 2, 5, 7, 8, 10, 11, 13
Lectures	25	1	1, 5, 10
Type: Autonomous			
To learn the theoretical and practical concepts complemented with bibliographic information, complementary practical works	84	3.36	12, 1, 4, 5, 10, 11, 13

A combined approach between the theoretical approach (block 1) and the most descriptive (block 2) with a continuous feedback between the reference to the undeformed state (original geological object) and the reference to the deformed state (real structure). This approach applies to the whole course, so that the concepts explained in theory, practices and in the field are interrelated continuously.

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 classroom practices	15%	4	0.16	6, 7, 8
Evaluation of field works	10%	5	0.2	6, 1, 2, 7, 8, 10, 11, 13
Exam of contents of Blocks 2 and 3	40%	3	0.12	12, 6, 1, 2, 3, 4, 5, 7, 8, 10, 13
Theoretical-practical test of the contents of Block 1, with availability of notes and teaching materials of all kinds	35%	3	0.12	12, 6, 1, 4, 5, 9, 11, 13

The assessment will be based on a summation of different qualifications in order to achieve a continuous assessment.

The final evaluation and rating will be based on the sum of the evaluations of:

(1) classroom practice file: 15% (non-retrievable, non-improveable)

(2) fieldwork: 10% (non-retrievable, non-improveable)

(3) theoretical-practical test of Block 1: 35% (retrievable, improveable)

(4) theoretical-practical test of Blocks 2 and 3: 40% (retrievable, improveable)

The weighted average will be obtained from the set of notes based on the specific weight of each of the parts.

To pass the subject by continuous assessment, you must have a minimum average of 5 and have made all the tests, field trips and handed in all coursework within the established deadlines. To average the different parts, a minimum of 3.5 is required for each of the two partial tests (3 and 4).

Retrieval exam: If the requirements exposed above are not met, or if the resulting final average is lower than 5, a retrieval exam may be taken on the date of the final assessment. To be able to attend the retrieval exam, students must have previously been assessed for continuous assessment activities that are equivalent to 2/3 of the final grade. Otherwise, the rating will be "not assessable". The retrievable activities in this exam will be activities (3) and (4). Students who have been approved by continuous assessment but who wish to improve their grade, may choose to do so on the same date as the final assessment, by communicating it by email to the teacher responsible for the subject 5 calendar days in advance of the exam date.

Unique assessment modality
Students who have accepted the single assessment modality must complete:
- a single final exam that will include all the content equivalent to tests (3) and (4) previously mentioned for continuous assessment.
- at the end of the exam, students will hand in the classroom (1) and field (2) practice files.
The grade obtained will be the weighted average of the three previous activities, where the theory exam will account for 75% of the grade, classroom practices 15% and field practices 10%. The same "non-assessable" criterion will be applied as for continuous assessment.
Retrieval exam: If the final grade is lower than 5, the student will have another opportunity to pass the subject through the retrieval exam that will be held on the date set by the degree coordinator. In the same way as in the continuous assessment, the retrievable activities in this exam will be activities (3) and (4). Students who wish to improve their grades may also choose to do so on the same date as the final assessment.

Under no circumstances will students be able to pass if they have not taken the field trips or if they have not submitted the classroom practices and files.

Use of AI
The use of Artificial Intelligence (AI) technologies is permitted as an integral part of the development of activities (1) and (2) and for the preparation of the exams corresponding to (3) and (4), provided that the final result reflects a significant contribution by the student in the analysis and personal reflection. The student must clearly identify which parts have been generated with this technology, specify the tools used and include a critical reflection on how these have influenced the process and the final result of the activity. The lack of transparency in the use of AI will be considered a lack of academic honesty and may lead to a penalty in the grade of the activity, or greater sanctions in serious cases.

Bibliography

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Van Der Pluijim, B., Marshak, S. 2003. Earth Structure. McGraw-Hill.

Software

No specific software will be used

Groups and Languages

Please note that this information is provisional until 30 November 2025. You can check it through this link. To consult the language you will need to enter the CODE of the subject.

Name	Group	Language	Semester	Turn
(PCAM) Field practices	1	Catalan	second semester	morning-mixed
(PLAB) Practical laboratories	1	Catalan	second semester	morning-mixed
(PLAB) Practical laboratories	2	Catalan	second semester	morning-mixed
(TE) Theory	1	Catalan	second semester	morning-mixed