

Academic Year/course: 2021/22

## 26442 - Tectonics: Basins and Orogens

### Syllabus Information

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**Academic Year:** 2021/22

**Subject:** 26442 - Tectonics: Basins and Orogens

**Faculty / School:** 100 - Facultad de Ciencias

**Degree:** 296 - Degree in Geology  
588 - Degree in Geology

**ECTS:** 5.0

**Year:** 4

**Semester:** Second semester

**Subject Type:** Optional

**Module:**

## 1. General information

### 1.1. Aims of the course

**The expected results of the course respond to the following general aims**

- 1- To provide advanced knowledge about the processes by which the deformation of the earth's crust occurs at regional scale.
- 2- To interpret the tectonic structures observed in terms of these processes.
- 3- To make accurate and precise cross-sections from the geometric point of view in different structural domains.
- 4- To introduce and apply the basic techniques of restoration of geological cross sections.
- 5- To incorporate geophysical data to interpret cross-sections in deep.
- 6- Introduce the basic techniques of analogue modelling of tectonic processes.
- 7- To understand in the field the structural features of a basin and / or chain.

### 1.2. Context and importance of this course in the degree

This course is part of a group of subjects of the *Degree in Geology* that constitute the necessary training for those students who want a complete training in Geodynamics and Structural Geology.

### 1.3. Recommendations to take this course

It is highly recommended to pass the modules of Structural Geology and Global Geophysics (or have similar training) in previous years.

## 2. Learning goals

### 2.1. Competences

**After completing the course, the student will be competent in the following skills:**

- To recognize the different structural styles in the Earth's crust .
- To understand the Earth's crust deformational processes at regional scale.
- To manage Spanish and English literature on evolution of orogens, basins and intraplate deformation.
- To analyze, synthesize and summarize specialized texts on evolution of orogens, basins and intraplate deformation.
- To properly communicate written, oral and graphical scientific content.
- To use the methods of geometric reconstruction of geological cross-sections.
- To manage restoration techniques of geological cross-sections.
- To construct correct geological cross-sections in regions with different structural styles.

- To construct deep geological cross-sections using geophysical data.
- To manage the basic techniques of experimental tectonics.
- To identify the structural features of a basin and / or orogen in the field.
- To collect structural data in the field and integrate them into a general cross section of an area.

## 2.2. Learning goals

**The student, in order to pass the course, will have to show her/his competence in the following skills:**

1. Understanding of the Earth crust deformational processes at regional scale.
2. Ability to interpret the tectonic structures observed in terms of those processes.
3. Ability to construct correct geological cross-sections from the geometric point of view and respecting the structural style of the area.
4. Knowledge and application of the basic techniques of restoration of geological sections.
5. Knowledge of the fundamentals and basic techniques of analogue modelling of tectonic processes.
6. Competence in the management of Castilian and English literature on evolution of orogens, basins and intraplate deformation.

## 2.3. Importance of learning goals

The correct execution of geological cross-sections combined with geological mapping constitute the usual work in structural geology and tectonics, as a tool to unravel the structure of a region and as a basis for the development of many applied works.

# 3. Assessment (1st and 2nd call)

## 3.1. Assessment tasks (description of tasks, marking system and assessment criteria)

**The student will prove that he/she has achieved the expected learning results by means of the following assessment tasks:**

**Continuous assessment:**

1. Resolution of 3 questionnaires and autonomous work on reading and commenting a scientific paper written in English (35%).
2. Course work about practice sessions (35%).
3. Report of the results of the fieldwork (30%).

**Global assessment:**

Written theoretical-practical exam (100%).

# 4. Methodology, learning tasks, syllabus and resources

## 4.1. Methodological overview

The methodology followed in this course is oriented towards the achievement of the learning objectives. A wide range of teaching and learning tasks are implemented, such as lectures, practice sessions, laboratory sessions, fieldwork, seminars and tutorials.

## 4.2. Learning tasks

This course is organized as follows:

- **Lectures** (12 hours). 2 weekly hours. The students will have lecture-notes given by the professor as the basis for their learning, but they must extend the information given in class using sources such as technical books and scientific journals.
- **Seminars** (3 hours). 3 sessions in one weekly hour.
- **Practice sessions** (16 hours) 8 sessions in two weekly hours. Construction of geological cross-sections in different geodynamic contexts. Students are provided with tasks guidelines for each practice session.
- **Laboratory sessions** (3 hours)(3 h/week, 1 session): construction of an analogue model of the formation of a fold and thrust belt.
- **Fieldwork** (16 hours) Two trips: a complete transect of and orogen (the Pyrenees).
- **Tutorials**. will be considered another academic activity where the student will be free to ask doubts related with the subject.



	Monday	Tuesday	Wed.	Thurs.	Friday
<b>Week 1</b>	Presentation of the course				
<b>Week 2</b>	Distribution questionnaire-1/ Theoretical class	Theoretical class			
		Practical session-1			
<b>Week 3</b>	Theoretical class	Theoretical class			
		Practical session-2			
<b>Week 4</b>	Theoretical class	Seminar-1			
		Practical session-3			
<b>Week 5</b>	Questionnaire-2/ Theoretical class	Theoretical class			
		Practical session-4			
<b>Week 6</b>	Theoretical class	Theoretical class			
		Practical session-5 (3 h) Analogue modelling			
<b>Week 7</b>	Theoretical class	Seminar-2			
		Practical session-6			
<b>Week 8</b>	Questionnaire-3/ Theoretical class	Theoretical class			
		Practical session-7			
<b>Week 9</b>	Theoretical class	Theoretical class			
		Practical session-8			
<b>Week 10</b>	Theoretical class	Seminar-3			
		Practical session-9			
<b>Week 11</b>					
<b>Week 12</b>					
<b>Week 13</b>					
<b>Week 14</b>				Transect Pyrenees (2 days)	

Further information concerning the timetable, classroom, office hours, assessment dates and other details regarding this course will be provided on the first day of class or please refer to the Faculty of Sciences website (<https://ciencias.unizar.es>; <https://cienciatierra.unizar.es>) and Moodle.

#### 4.5. Bibliography and recommended resources

<http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=26442>