

Academic Year/course: 2021/22

26417 - Stratigraphic Correlation and Synthesis

Syllabus Information

Academic Year: 2021/22

Subject: 26417 - Stratigraphic Correlation and Synthesis

Faculty / School: 100 - Facultad de Ciencias

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

ECTS: 7.0

Year: 3

Semester: First semester

Subject Type: Compulsory

Module:

1. General information

2. Learning goals

3. Assessment (1st and 2nd call)

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, laboratory sessions, fieldwork and tutorials.

4.2. Learning tasks

This 7 ECTS (175 hours) course is organized as follows:

- **Lectures and seminars** (35 hours). Participatory sessions through which basic knowledge is transmitted. Seminars will address some relevant aspects to complement laboratory sessions and fieldwork. Different useful material related to the course will be available in the online learning platform (Moodle).
- **Fieldwork** (4 days). 28 hours (13 + 15). In the field trips, students will obtain the necessary data that later will be analyzed in laboratory sessions. They will demonstrate the degree of understanding of the course as well as a correct application of concepts, methods and techniques used.
- **Laboratory sessions** (22 hours). 11 sessions in which students will analyze data obtained in the fieldwork.
- **Autonomous work and study** (86 hours)
- **Tutorials**. Students can attend tutorials in order to ask questions about any course content.
- **Exam** (4 hours).

Teaching and assessment activities will be carried out on site for as long and as much as possible. This scenario could change if safety regulations related to the covid19 crisis recommended online activities.

4.3. Syllabus

This course will address the following topics:

- **Topic 1.** Facies and geometry distributions of the sedimentary bodies. Lateral and vertical changes of facies. Walther's Law: concept, applicability and limitations. Geometry of deposits. Depocenter concept. Vertical and frontal accretion. Aggradation, progradation and retrogradation. Clinoform concept. Lateral terminations of the sedimentary bodies: onlap and offlap; toplap and downlap. Chronostratigraphic restitutions. The Wheeler diagram.
- **Topic 2.** Discontinuities and syntectonic sedimentation. Types of discontinuity. Recognition of discontinuities in the marine environment and in the continental environment. The condensed sections. Angular, progressive and low-angle unconformities. Syntectonic sedimentation in compressive and in extensional regime. Lateral variation of the discontinuities.
- **Topic 3.** Stratigraphic correlations: concept and criteria. Definition, objectives and implications. Criteria and methods of correlation. Correlation graphs
- **Topic 4.** Control factors in the filling of the basins: transgressions and regressions. Accommodation concept. Interaction between sedimentary supply, eustasy and subsidence. Sahlllowing and deepening upward successions. Transgression and marine flooding surfaces. Normal regressions and forced regressions. Global variations in sea level: causes, duration and amplitude of eustatic cycles. Cycles of orbital origin and tectono-eustatism. Global eustatic curves as a correlation tool. Reconstruction of sea level variations. Physical accommodation vs. ecological accommodation.
- **Topic 5.** Maps of stratigraphic synthesis. Structural contour maps. Isopac maps. Facies maps. Paleogeographic maps. The palinspastic reconstructions.
- **Topic 6.** Cystostratigraphy. Definition, origin and classification of sedimentary cycles and sequences. Sub-orbital and orbital cycles. High frequency sequences (parasequences). The Fischer diagram.
- **Topic 7.** Sequential and sequential stratigraphy: genetic stratigraphic units. The third order cycles: the depositional sequence and the systems tracks. Recognition in seismic lines: the lithosismic units. The T-R cycles (transgressive-regressive). Tectosedimentary units (UTS): concept and types of sedimentary ruptures. Macro-scale sequences.
- **Topic 8.** Events in the stratigraphic record. Concept and types of events. Sedimentological, cosmic, magnetic, seismic, volcanic and bioevents events. The guide layers. Climatic and anoxic events: recognition from stable isotopes.
- **Topic 9.** Sedimentary Basins: Concept of sedimentary basin. Passive and active continental margins: the Wilson cycle. Analysis of subsidence. Classification of sedimentary basins. Characteristics of the different types of basins.

Laboratory sessions

The sessions are organized in order to work and solve questions about the cases that have been previously visited and introduced in the field. Each case is assigned one or two sessions of two laboratory hours. This program includes the resolution of up to 9 case studies. The topics covered by the laboratory sessions deal with the following topics:

- Correlation of sedimentary successions from distributions of facies and discontinuities in continental, coastal and marine environments. Preparation of maps of facies distributions.
- Analysis of marine, transitional and continental environments
- Reconstruction of sedimentary architecture in terrigenous and carbonate systems.
- Reconstruction of sedimentary basins: preparation of isopaque maps.

Fieldwork

- **Trip 1.** Correlation, sequences, discontinuities and facies lateral relationships (Sierra de Albarracín): application to carbonate platform systems
- **Trip 2.** Correlation, sequences, discontinuities and facies lateral relationships (Galve Sub-basin): application to continental to coastal environments
- **Trip 3.** Discontinuities, sintectonic deposits and macroscale T / R cycles (Oliete Sub-basin): applications to shallow marine and continental deposits.
- **Trip 4.** Correlation and high frequency cycles (Ricla-Ruesca): applications to shallow marine and continental deposits.

4.4. Course planning and calendar

- Exam: the start time and duration of the global test will be established in the schedule of exams of the Sciences Faculty and announced at least 3 days in advance in the ADD and the bulletin board of the Stratigraphy Area.
- Fieldwork trips will be scheduled in coordination with lectures and laboratory sessions.

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 and Earth Sciences Department

websites (<https://ciencias.unizar.es>, <https://cienciatierra.unizar.es>) and Moodle.

4.5. Bibliography and recommended resources

http://biblos.unizar.es/br/br_citas.php?codigo=26417&year=2020