

26417 - Stratigraphic Correlation and Synthesis

Información del Plan Docente

Academic Year	2016/17
Academic center	100 - Facultad de Ciencias
Degree	296 - Degree in Geology
ECTS	7.0
Course	3
Period	First semester
Subject Type	Compulsory
Module	---

1.Basic info

1.1.Recommendations to take this course

1.2.Activities and key dates for the course

2.Initiation

2.1.Learning outcomes that define the subject

2.2.Introduction

3.Context and competences

3.1.Goals

3.2.Context and meaning of the subject in the degree

3.3.Competences

3.4.Importance of learning outcomes

4.Evaluation

5.Activities and resources

5.1.General methodological presentation

The course consists of three complementary parts: theory, laboratory practice and field practice.

The proposed activities are based on the transmission of basic and essential knowledge through participatory lectures.

This knowledge is complemented by practical and field activities in which the student has to demonstrate the degree of understanding of the subject as well as a correct application of concepts, methods and techniques used.

In addition, tutorials are a complementary activity in which the student can consult or complete issues.

Finally, different useful material related to the subject is available in the ADD.

5.2.Learning activities

26417 - Stratigraphic Correlation and Synthesis

The program includes the following activities:

- **Lectures: They consist on participatory master classes involving a total of 35 hours.**

- **Laboratory: 11 sessions involving a total of 22 hours.**

- **4 fieldtrips involving a total of 28 hours (13 + 15).**

- **Complementary activities and exercises** (personal work, without the presence of the teacher) mainly related to the laboratory classes, and to a lesser extent, theoretical and field aspects: 20 hours.

These activities and exercises will be reviewed, corrected and evaluated by the teacher.

- **Querying and study for overcoming the written tests** : 66 hours.

- **Examination** : 4 hours.

5.3.Program

Part 1.- BASIC NOTIONS

1.1.- STRATA ASSOCIATION

Patterns of strata growth

Agradation;

Progradation

Retrogradation

Changes in the sedimentation area

Overlaps

26417 - Stratigraphic Correlation and Synthesis

Lateral terminations of strata

Lapout

Truncation

1.2.- GEOMETRIC RELATIONS BETWEEN STRATA

Concepts of concordance and discordance

Concepts of conformity and unconformity

Diastems

Hiatuses (nondepositional hiatus and erosional hiatus)

Unconformity types

Angular unconformity

Disconformity

Paraconformity

Nonconformity

Chronostratigraphic sections

Criteria for recognition of unconformities

Stratigraphic criteria

Paleontological criteria

Structural criteria

Geomorphological criteria

Angular unconformity types

26417 - Stratigraphic Correlation and Synthesis

Cartographic unconformities

Cumulative wedging out

Syntectonic unconformities

1.3.- SEISMIC STRATIGRAPHY

Principles of reflection seismic methods

Application of reflection seismic methods to stratigraphic analysis

Parameters used in seismic stratigraphic interpretation

Reflection configuration;

Reflection continuity

Reflection amplitude

Reflection frequency

Interval velocity

External form and areal association of seismic facies units

Part 2.- STRATIGRAPHIC CORRELATION

Concept of stratigraphic correlation

Correlation criteria

Physical criteria of correlation

Biological criteria of correlation

Part 3.- BASIN ANALYSIS

26417 - Stratigraphic Correlation and Synthesis

3.1.- CONTROLS OF BASIN FILL

Subsidence

Eustacy

Sedimentary supply

Interplay between subsidence, eustacy and sedimentary supply

3.2.- TRANSGRESSIONS Y REGRESSIONS

Concept of transgression and regression

Controls on transgressions and regressions

Transgression and regression types

3.3.- DEPOSITIONAL SEQUENCES AND SEQUENCE STRATIGRAPHY

Concept of depositional sequence

Cycles of relative change of sea level

Indicators of relative changes of sea level

Tectosedimentary units

Sequence boundaries

Parasequences and parasequence sets

Systems tracts

3.4.- STRATIGRAPHIC MAPS

Introduction

26417 - Stratigraphic Correlation and Synthesis

Compilation of map data

Stratigraphic maps

Structure-contour maps

Isopach maps

Facies maps

Facies triangle

Paleogeologic maps

Paleogeographic maps

Palinspastic maps

3.5.- SEDIMENTARY BASINS

Concept of sedimentary basin

Tectonic basin classification

Basin models

5.4.Planning and scheduling

The course consists of 7 ECTS (175 hours of student work) distributed as follows:

Theory classes (35 h). They will be held according to the schedule established by the Sciences Faculty.

Laboratory classes (22 h). They will be held according to the schedule established by the Sciences Faculty.

Field classes (4 days) coordinated with theoretical and practical classes. The field calendar is available on the website of the Department of Earth Sciences.

26417 - Stratigraphic Correlation and Synthesis

- 86 hours of personal work. It includes study as well as implementation of works and practices (20 hours).

- 4 hours of examination. The start time and duration of the global test will be established in the schedule of examinations of the Sciences Faculty and announced at least 3 days before in the ADD and the bulletin board of the Stratigraphy Area.

5.5. Bibliography and recommended resources

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- BB** Dabrio González, Cristino José. Estratigrafía / Cristino J. Dabrio, Santiago Hernando Madrid : Facultad de Ciencias Geológicas, Universidad Complutense de Madrid, [2003]
- BB** Dunbar, Carl O.. Principios de estratigrafía / Carl O. Dunbar, John Rodgers ; [traducido por Manuel Álvarez] . - 1ª ed., 4ª impr. Barcelona [etc.] : Compañía Editorial Continental, 1976
- BB** Estratigrafía / Inmaculada Corrales Zarauza...[et al.] Madrid : Rueda, D.L. 1977
- BB** Krumbein, W.C.. Stratigraphy and sedimentation / by W.C. Krumbein and L.L. Sloss . - 2nd ed. San Francisco : W.H. Freeman, cop. 1963
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- BB** Stratigraphie et paléogéographie : principes et méthodes / par Charles Pomerol...[et al.] ; avec la collaboration de Yves Gourinard...[et al.] Paris : Doin, cop. 1980
- BB** Vera Torres, Juan Antonio. Estratigrafía : principios y métodos / Juan Antonio Vera

26417 - Stratigraphic Correlation and Synthesis

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- BC** Allen, Philip A.. Basin analysis : principles and applications / Philip A. Allen, John R. Allen . - 2nd ed. Oxford [etc.] : Blackwell Science, 2005
- BC** Bishop, M. S.. Subsurface Mapping Wiley (1967)
- BC** Einsele, Gerhard. Sedimentary basins : evolution, facies, and sediment budget / Gerhard Einsele . - 2nd, completely rev. and enl. ed Berlin [etc.] : Springer, cop. 2000
- BC** Mitchum, R.M., Vail, P.R. and Thompson, S. (1977).- Seismic stratigraphy and global changes of sea level, Part 2: The depositional sequence as a basic unit for stratigraphic analysis. En: Seismic stratigraphy : applications to hydrocarbon exploration / edited by Charles E. Payton . - 1st ed., 8th printing Tulsa, Oklahoma : American Association of Petroleum Geologists, 1985
- BC** The sedimentary record of sea-level change / edited by Angela L. Coe ; authors, Angela L. Coe... [et al.] . 1st published, repr. with corrections Cambridge : The Open University ; Cambridge University Press, 2005
- BC** Vail, P.R., Mitchum, R.M. and Thompson, S. (1977).- Seismic stratigraphy and global changes of sea level, Part 3: Relative changes of sea level from coastal onlap. En: Seismic stratigraphy : applications to hydrocarbon exploration / edited by Charles E. Payton . - 1st ed., 8th printing Tulsa, Oklahoma : American Association of Petroleum Geologists, 1985