

COURSE: STRATIGRAPHY AND SEDIMENTOLOGYACADEMIC YEAR: **2017-2018**

TYPE OF EDUCATIONAL ACTIVITY: lectures and practice exercises

TEACHER: Sergio G. Longhitano

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ECTS: 6 (4 ECTS of frontal lectures and tutorials; 2 ECTS of practice)

n. of hours: 56 (32 h of lessons and tutorials; 24 h of practice)

Campus: **Potenza**
Dept./School: **Dipartimento di Scienze**Semester:
I Semester: from 02/10/2017 to 15-31/01/2018**EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES**

The Stratigraphy and Sedimentology Course aims in transmitting to each student the criteria for the subdivision, classification and interpretation of sedimentary sequences, to the various scales of analysis, both in outcrop and in subsurface. At the same time, the principles for the recognition of the main types of sediments and sedimentary rocks will be recalled, as well as the systematic description and cataloging and the analysis of the main physical characteristics. The course provides the elements to acquire practice on the use of the most common stratigraphic analysis techniques (e.g., correlation) as well as some of the most common sedimentological methods of data acquirement, both on the field and in the lab. The course also proposes the study of some stratigraphic successions of regional significance as well as sedimentological elements that characterize the main depositional systems, with emphasis on continental and marine-marginal examples. Finally, the course proposes some applications on the basic concepts of Stratigraphy and Sedimentology (e.g., reservoir characterization, recognition of sediment sampling areas for nourishment of retreating littorals or for the industry).

PRE-REQUIREMENTS

Each student should possess the basic knowledge in Geology, possibly acquired with the frequency of the 1-year courses

SYLLABUS**1. INTRODUCTION TO STRATIGRAPHY AND SEDIMENTOLOGY****2. STRATIGRAPHY: BASIC CONCEPTS AND LITHOSTRATIGRAPHY**

- a. Basics in Stratigraphy. The geological time scale in stratigraphic sequences. Stratigraphic units. Lithostratigraphy. Examples of application of the Stratigraphy in Earth Sciences.
- b. The strata/bed (physical and genetic definition). Stratigraphic surfaces, strata thicknesses and bedding styles. Cycles. Simple and complex rhythms. Thickening and thinning-upward sequences. Types of bedding (Simple, Wavy and inclined).
- c. International Classification Units. Basic stratigraphic classification units. Classification of stratigraphic contacts. Unconformities, genesis and meaning. Stratigraphic Units. Lithostratigraphic units (formation and member). Biostratigraphic Units. Chronostratigraphic Units and Absolute Dating Methods. Magnetostratigraphic Units. Synthetic Units. Unconformity Bounded Stratigraphic Units (U.B.S.U.). Depositional Sequences (Basics).
- d. Sequence Stratigraphy. Basic Concepts of Sequence Stratigraphy. Cyclic sedimentation linked to sea level oscillations. Absolute and relative sea-level changes. The Depositional Sequence (definition). Hierarchy of depositional sequences (supersequences, sequences, parasequences, and high frequency cycles). Systems Tracts. Sequence boundaries, transgression surfaces, regression, maximum flooding and their dynamic meaning. Examples from the field and from seismic images.
- e. Stratigraphic correlation: methods, examples and applications (exercises).

3. SEDIMENTOLOGY

- a. Basics on of clastic and non-clastic sediments; textural features of siliciclastic, carbonate and mixed sediments; erosion, transport and sedimentation processes; main types of sediments and sedimentary rocks; sedimentary basins.
- b. Principles of hydrodynamics. hydrostatic and hydrodynamic conditions in a fluid; Reynolds number: laminar flow and turbulent flow; Bagnold equation; Concept of 'boundary layer'.
- c. Sedimentary processes (selective and massive).
- d. Sedimentary structures in clastic sediments. Tractive, erosional and deformational structures. More rare sedimentary structures. The concept of sedimentary Facies. Meaning and interpretation of sedimentary facies; Vertical facies successions. The concept of Facies Heteropia. The Walther's Law.

TEACHING METHODS

frontal lectures, lab exercises and field trips.

EVALUATION METHODS

Evaluation and assessment of the learning will be performed through an initial practical test, on which the oral interview will be held on during the same day. This latter will also focus on the topics discussed during the frontal lectures and the field/lab practice activity.

TEXTBOOKS AND ON-LINE EDUCATIONAL MATERIAL

- Gary Nichols, 2009. *Sedimentology and Stratigraphy (Second Edition)* John Wiley & Sons, Ltd., Publication
 - Additional educational material from the teacher
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INTERACTION WITH STUDENTS

EXAMINATION SESSIONS (FORECAST)¹

February 2018 Tuesday, 13

March 2018 Tuesday, 13

May 2018 Wednesday, 16

June 2018 Tuesday, 12

July 2018 Tuesday, 10

September 2018 Tuesday, 11

October 2018 Tuesday, 9

November 2018 Tuesday, 20

December 2018 Tuesday, 18

SEMINARS BY EXTERNAL EXPERTS YES ☐ NO

FURTHER INFORMATION

¹Subject to possible changes: check the web site of the Teacher or the Department/School for updates.