General information		
Academic subject	**SEDIMENTOLOGY**	
Degree course	Environmental Sciences	
Academic Year	II	
European Credit Transfer and Accumulation System (ECTS)		6 CFU
Language	Italian	
Academic calendar (starting and ending date)	1st March – 6th June 2022	
Attendance	Strongly recommended	

Professor/ Lecturer	
Name and Surname	Massimo Moretti
E-mail	massimo.moretti@uniba.it
Telephone	340 6450897
Department and address	Dipartimento di Scienze della Terra e Geoambientali
Virtual headquarters	Link: https://bit.ly/3AJzssh Teams Code: hc2r32b
Tutoring (time and day)	Monday (8:40 - 10:20 AM) - UniBA Paolo VI Taranto or online on Teams (please book a meeting by mail)

Syllabus	
Learning Objectives	The Sedimentology course has the primary purpose of providing the student with basic knowledge of the physics processes that regulate the spatial and temporal evolution of sedimentary environments. The topics covered are the classic ones of Stratigraphy and Sedimentology for the degree in Geology, but these are transferred with particular reference to the recent-present-day evolution of sedimentary environments. The general objective of the teaching therefore also involves understanding the continuous interaction between physical and chemical-biological processes in an interdisciplinary context typical of class L32.
Course prerequisites	The achievement of the educational objectives requires the knowledge acquired i) in the teachings in the first year (essentially Physics I and Physical Geography) and ii) generic skills in scientific subjects. Working and non-attending students possess these prerequisites in a very similar way to attending students.
Contents	**Introduction.** What does sedimentology study? The main applications of Sedimentology to the Environmental Issues. *Clastic sediments* Grain-size analysis and statistical procedures on the grain-size distributions. *Fluid dynamics* Fluid motion (steady, non-stationary, uniform and not uniform); laminar flows and turbulent flows; the number of Reynolds and the transition between laminar and turbulent regime; the boundary layer; Bagnold equation; suspended load and bed load; Hjulstrom diagram; Traction and in mass flows and the recognition of their sedimentary products. *Sedimentary structures* Traction structures, Froude number and Leeder diagram; ripples and cross-lamination; types of ripples (asymmetric, symmetrical, interference, climbing); parallel lamination;

	bars and sand wave; scour and fill; hummocky and swaley; flaser, lenticular and wavy lamination. Debris flows, gravitative flows and their products. Graded lamination and bedding. Erosional structures, scale and distribution. The nature of erosional surfaces. Mark and Cast. Chemical, physical and biogenic structures Soft-sediment deformation structures *Stratigraphy and Sedimentology* Definition of Bed and Bedding. Bed sets. thinning e thickening upward and fining-coarsening-upward sequences. Facies definition: the Walther's Law. *Sedimentary environments* Facies associations, sub-environments, sedimentary environments and depositional systems. *Continental environments* Alluvial fans, braided, meander and anastomosing rivers, lacustrine and eolian environments *Transitional environments* Wave-dominated beaches and deltas *Marine environments* Passive margins and continental shelf/slope/abyssal plain systems. Trench and foreland basins in subduction setting. Carbonate platforms. Sequence stratigraphy and evolution of sedimentary environments *Examples of Sedimentology applied to Environmental problems*.
Books and bibliography	Ricci Lucchi F., Sedimentologia. 3 volums, Bologna, CLUEB, 1980. Bosellini B., Mutti E., Ricci Lucchi F. Rocce e successioni sedimentarie. UTET. 1989. Ricci Lucchi, F. Sedimentografia. Atlante fotografico delle strutture dei sedimenti. Zanichelli 1992.
Additional materials	*Notes and slides*

Work schedule			
Total	Lectures	Hands on (Laboratory, working groups, seminars, field trips)	Out-of-class study hours/ Self-study hours
Hours			
69	45	24	81
ECTS			
8	6	1 (field trips)	

Teaching strategy	
	The teaching uses two ways of providing knowledge. - The lectures are delivered with .ppt presentations and with the aid of diagrams and demonstrations drawn on the blackboard. The exercises are carried out by the students in the hours reserved for the study, using specific software for the quantitative assessment of the texture of the sediments. - In the field trips, the training takes place directly in the present-day and fossil environments and the students are guided in the data collection phase as autonomous or collective activity
Expected learning outcomes	

Knowledge and understanding on:	The expectations on the training activities concern both the assimilation of the basic concepts of Sedimentology and the ability to apply such concepts. Training is aimed at understanding the processes that govern the sedimentation dynamics. Learning of sedimentary processes using a rigorous scientific approach, supporting each concept with field data, analog models and numerical models.
Applying knowledge and understanding on:	Students learn how to apply the basic concepts of sedimentology (grain-size, morphology of sediments, fluid dynamics rules, kind of sedimentary flows, sedimentary structures, etc.) to the complex environmental systems such as sedimentary environments; furthermore, students learn to apply the knowledge of sedimentary processes in present-day continental/transition/marine contexts and, through the basic principles of geology, to the "fossil" deposits. It allows to acquire the ability to predict volumes, geometries and lithological features of sedimentary bodies.
Soft skills	*Making informed judgments and choices* The ability to identify approaches and techniques that are suitable for solving procedures of specific issues. This skill is verified and stimulated in laboratory and field activities through discussion and first confrontation on educational cases and, later, on real environmental issues of increasing complexity. *Communicating knowledge and understanding* Ability to express the theoretical and practical aspects related to study topics, with particular reference to the description of the techniques and procedures for measuring, processing and interpreting data collected in the campaign or on samples using specific language properties. The ability to describe, in a direct and logical way, the relationships between the the main concepts learned in the lessons. *Capacities to continue learning* Acquiring the ability to analyze complex issues through linear learning pathways. The integration of these basic pathways takes place through autonomous arguments aimed at recognizing interactions between different environmental matrices (eg biological activity).

Assessment and feedback	
Methods of assessment	During the course, students are involved in lectures through simple questions or by asking them to draw diagrams / formulas on the blackboard. Students are also asked to carry out exercises during the study hours and are able to understand their state of preparation by discussing the results during the lectures.
Evaluation criteria	*Knowledge and understanding* The student must know in detail the processes of erosion, transport and sedimentation in the different sedimentary environments He must demonstrate to know the main tools for the evaluation of the relationship between sediment processes and products. *Applying knowledge and understanding*

	The student must be able to apply the theoretical principles that govern the interaction between fluid dynamics, granulometry and sediment morphometry. The knowledge gained about the interactions between different depositional processes and the understanding of the factors that govern the evolution of depositional systems over time should be applied to known examples. *Autonomy of judgment* The student must demonstrate how to opt for a methodological approach that describes, measures, interprets the main physical processes that govern the dynamics of sedimentary environments. *Communication skills* The student must demonstrate the ability to show his level of knowledge and understanding achieved with clarity and specific language properties *Capacities to continue learning* The student must demonstrate the ability to learn the course topics through a reasoned path that will help his problem solving skills. The student must also demonstrate that he has acquired individual learning experiences through the computer tools for the treatment of sedimentary data.
Criteria for assessment and attribution of the final mark	The student's evaluation is expressed out of thirty and foresees only an oral test. An excellent grade will be the result of the satisfaction of most of the analytically described evaluation criteria.
Additional information	

Bari, 22/09/2021

Signature

(Prof. Massimo Moretti)

Corso di Laurea Triennale in Scienze Ambientali L32
Coordinatore: Prof. Massimo Moretti
Campus Universitario, via E. Orabona 4, 70126 Bari (Italy)
Tel: +39 0805442563 Fax: +39 0805442625
email: massimo.moretti@uniba.it