



UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Scienze della Terra e del Mare		
ACADEMIC YEAR	2023/2024		
BACHELOR'S DEGREE (BSC)	GEOLOGY		
SUBJECT	STRATIGRAPHIC AND SEDIMENTARY GEOLOGY		
TYPE OF EDUCATIONAL ACTIVITY	A		
AMBIT	50192-Discipline geologiche		
CODE	17820		
SCIENTIFIC SECTOR(S)	GEO/02		
HEAD PROFESSOR(S)	AGATE MAURO	Professore Associato	Univ. di PALERMO
OTHER PROFESSOR(S)			
CREDITS	9		
INDIVIDUAL STUDY (Hrs)	137		
COURSE ACTIVITY (Hrs)	88		
PROPAEDEUTICAL SUBJECTS			
MUTUALIZATION			
YEAR	1		
TERM (SEMESTER)	2° semester		
ATTENDANCE	Mandatory		
EVALUATION	Out of 30		
TEACHER OFFICE HOURS	<p>AGATE MAURO</p> <p>Monday 12:30 14:00 studio del docente, stanza n°3 al terzo piano del Dip. di Scienze della Terra e del Mare, via Archirafi 20</p> <p>Friday 12:30 14:00 studio del docente, stanza n°3 al terzo piano del Dip. di Scienze della Terra e del Mare, via Archirafi 20</p>		

DOCENTE: Prof. MAURO AGATE

PREREQUISITES	Knowledge of the topics covered in the courses of the first semester, first year. General knowledge of geography and reading of geographic and topographic maps
LEARNING OUTCOMES	Knowledges of the basic concepts on geology of the Earth, in particular: the lithospheric processes, the rock cycle and the stratigraphic subdivisions. Understanding the geological features of an area also through the reading and interpretation of geological maps. Capacity to apply the acquired skills and to use the specific language of the geological sciences. Capacity to recognize independently the basic geological features of an area, capacity to read and interpret a geological map and to recognize the main types of rock successions and their primary or secondary geometric relationships. Be able to describe and classify macroscopically the sedimentary rocks and the main type of igneous and metamorphic rocks. Being able to recognize and interpret the sedimentary facies of the most common depositional environments. Being able to evaluate the results and implications of basic geological studies. Capability to expose the results of geological studies, even to a non-expert public. Be able to support the importance and highlight the repercussions of the geological studies in the territory. 'Learning upgrade capacity' through the consultation of the geological cartography and scientific publications in the field of Geology. Using the knowledge gained in the study course, capacity to follow advanced seminars in Geology
ASSESSMENT METHODS	Methods for assessment of the student learning Learning objectives are primarily assessed through a written assignment followed by an oral examination. As result of the written assignment the student has to produce a reasonable cross-section illustrating the subsurface geology based on the evidence of a geological map. As oral examination the student must discuss at least two / three questions, on all parts of the program, with reference to the recommended books and the educational material provided. A macroscopic recognition of three rock samples is expected before the oral examination. Two intermediate tests are also planned: The first one concerns the recognition of rock samples, the second one concerns the reading of geological maps and the realization of geological sections. If the rocks test will be passed, no rocks recognition at the oral exam will be required. If the test on geological maps and geological sections will be passed, no written assignment will required . The audit aims to assess whether the student has knowledge and understanding of the topics, has acquired interpretative competence and independence of judgment in basic geology. In order to get a score of not less than 18/30, the student must demonstrate that he has achieved elementary knowledges on the topics described in the Program, is able to connect basic knowledges, shows that it has acquired a minimum degree of autonomy; the language is enough to communicate with the examiners. To get a score of 30/30 and praise, the student must demonstrate that he has achieved excellent results. The goals achieved are considered excellent when the candidate demonstrates full knowledge of the topics of the program, demonstrates that it is able to apply the acquired knowledges in different / new / advanced fields than those of the didactics a specific reference language and capable of elaborating and expressing independent judgments based on acquired knowledge.
EDUCATIONAL OBJECTIVES	The introduction of the course will focus on the general knowledges on the Earth interior. The study and recognition of igneous, sedimentary and metamorphic rocks will follow, especially focusing on the petrogenesis of the sedimentary rocks. A second part of the course will be devoted to the principles of stratigraphy, the main stratigraphic units, the relations of continuity and discontinuity along the sedimentary successions. The third part of the course will examine the concept of sedimentary facies and their lateral and vertical organization. A fourth part of the course will focus on the sea level changes, subsidence mechanisms, isostasy. A short synthesis of the geological history of our planet will be summarized at the end of the course. The laboratory activity will help students to identify key minerals, mineral assemblages, or other compositional and/or textural features, in order to properly classified a rock sample. A second part of the laboratory activities will introduce the methods and techniques to read a geological map of an area and to perform a geological section based on a simple geological map. A field trip focused on the

	sedimentary successions of Sicily will complete the lab activities (if will be available the financial support). As an alternative, students will follow further laboratory activities on the geological maps and their interpretation
TEACHING METHODS	classroom lessons, laboratory activities
SUGGESTED BIBLIOGRAPHY	<p>S. Marshak: "La Terra, ritratto di un pianeta" - Zanichelli. Appunti del corso Altri testi consultabili (disponibili in biblioteca) Bosellini - Le scienze della Terra, seconda edizione - Italo Bovolenta editore Bosellini, Mutti & Ricci Lucchi - Rocce e successioni sedimentarie – UTET; John P. Grotzinger Thomas H Jordan "Capire la Terra". Terza edizione italiana condotta sulla settima edizione americana. A cura di Elvidio Lupia Palmieri, Maurizio Parotto. ZANICHELLI</p> <p>Testi consigliati per il Laboratorio di rocce e cartografia - Tucker M.E. – Guida alla descrizione delle rocce sedimentarie sul terreno – Dario Flaccovio Ed. Adams A.E. Mackenzie W.S., Guilford G. (1988): Atlante delle rocce sedimentarie al microscopio. Zanichelli, Bologna. Collezione di carte geologiche del laboratorio - Fogli geologici in scala 1:50.000 e note illustrative sul sito ISPRA CARG</p>

SYLLABUS

Hrs	Frontal teaching
5	The structure of the Earth: Crust (continental and oceanic) , Lithosphere, asthenosphere, mantle, mesosphere, core, terrestrial heat and convective cells
6	Rock cycle, differences between minerals and rocks. Rock forming minerals, Igneous and metamorphic rocks. The sedimentary cycle: weathering, transport, sedimentation, diagenesis
5	Classifications of the sedimentary rocks. Textural components (grains, matrix, cements). Granulometric scales and parameters. Grain morphology and morphometry and fabric. Mineralogic and textural maturity.
2	Terrigenous silicoclastic rocks: conglomerates, sandstones, clays
2	Carbonate sediments and rocks; Folk's particles, concretionary and bioconstructed limestones
5	Principles of stratigraphy and stratigraphic units. Lithostratigraphy, Unconformity bounded stratigraphic units, Biostratigraphy and biozones; magnetostratigraphy, chronostratigraphy. Relationships between different types of stratigraphic units. Absolute dating. Concept of GSSP.
4	Discontinuity surfaces, stratigraphic gaps, paraconformity, angular unconformity, disconformity, unconformity
5	Sedimentary structures, bedding, clinoforms, lamination, ripple marks, dunes, load casts, etc. Stratigraphic successions and correlations.
8	Facies concept, facies associations and sequences. Walther's principle. Facies boundaries, lateral facies transitions, relationships between facies and lithostratigraphic units. Facies associations: transgressive, stationary, regressive. Lateral and vertical contacts between rock units at local and regional scale: onlap, downlap, erosional truncation, toplap. Sedimentary cycles and rhythms
6	Main sedimentary environments (continental, transitional, shallow marine and deep-marine).
6	The processes of the sedimentary dynamics: global and local sea level changes, mechanisms of subsidence, isostasis
2	L'evoluzione geologica della Terra dalle origini all'attuale.
Hrs	Workshops
4	Identify key minerals, mineral assemblages, or other compositional and/or textural features in a rock sample in order to classify the main types of igneous and metamorphic rocks.
10	Identify key minerals, mineral assemblages, or other compositional and/or textural features in a rock sample in order to classify the main types of sedimentary rocks.
12	Methods and techniques to produce a geological section of an area
6	Reading of official geological maps and thematic maps