UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Scienze della Terra e del Mare
ACADEMIC YEAR	2018/2019
BACHELOR'S DEGREE (BSC)	NATURAL AND ENVIRONMENTAL SCIENCE
INTEGRATED COURSE	MINERALOGY AND PETROGRAPHY - INTEGRATED COURSE
CODE	19860
MODULES	Yes
NUMBER OF MODULES	2
SCIENTIFIC SECTOR(S)	GEO/06, GEO/07
HEAD PROFESSOR(S)	MERLI MARCELLO Professore Associato Univ. di PALERMO
OTHER PROFESSOR(S)	MERLI MARCELLO Professore Associato Univ. di PALERMO SCOPELLITI GIOVANNA Professore Associato Univ. di PALERMO
CREDITS	12
PROPAEDEUTICAL SUBJECTS	
MUTUALIZATION	
YEAR	2
TERM (SEMESTER)	2° semester
ATTENDANCE	Not mandatory
EVALUATION	Out of 30
TEACHER OFFICE HOURS	**MERLI MARCELLO** Wednesday 10:00 12:00 Dip.to Distem - V. Archirafi 36 II piano ammezzato (stanza del Prof. Merli) **SCOPELLITI GIOVANNA** Tuesday 15:00 16:00 Via Archirafi 36, II piano, stanza II-4

DOCENTE: Prof. MARCELLO MERLI

PREREQUISITES	Knowledge and skill of the contents of the courses of Mathematics, Chemistry.
LEARNING OUTCOMES	The student 1) must demonstrate knowledge of the basic principles for understanding the chemical and physical phenomena related to the genesis, the transformation and the assemblages of minerals, inferring these principles to more general geo-petrological issues to be addressed in subsequent courses. 2) should be able to apply his knowledge and understanding in developing the ability to correlate the different topics, as well as to recognize the appropriate analytical technique depending on the problem to be solved. 3) must be able to independently assess the implications in the fields of geo-petrology and material science of the phenomena studied throughout the course. 4) must be able to communicate the results of mineralogical studies and must have acquired a high degree of synthesis, which is necessary to gut the essential terms of the issues under study. 5) must be able to choose the appropriate learning method for every issue, depending on the subject, and to increase his ability to extend his knowledge by reading scientific publications and with the help of web browsing.
ASSESSMENT METHODS	Grade in thirtieths as the average of: 1) Ongoing evaluation: recognition of minerals in thin section (At least 4 out of 6). 2) Final oral examination: broad discussion on all the topics of the course , focusing optics and systematic mineralogy. The examination could include an identification of minerals in thin section for those who had not taken or passed laboratory examination. The exam involves 4/5 questions per subject to test the knowledge of each topic, the use of an appropriate scientific language, and the ability to link the various arguments with each other with ease. The minimum requirements for passing the exam are: I) mineral recognition in thin section and knowledge of the principles of mineralogical optics; Ii) knowledge of the systematic nature of the principal minerals constituting the rocks; Iii) knowledge of the principles and the use of the principal mineralogical analysis techniques To get a grade not less than 18/30, the student must demonstrate a basic achievement of the goals, i.e. when he demonstrates that he has acquired a basic knowledge of the topics described in the program, and shows a limited degree of autonomy. To achieve 30 with honors, the student must demonstrate that he has achieved the objectives well. The goals achieved are considered excellent when examining has gained full knowledge of the subjects of the program, demonstrates knowing how to apply the acquired knowledge in different / new / advanced contexts, he expresses it with lexical competence and is able to express autonomous judgments based on acquired knowledge.
TEACHING METHODS	Theory classroom-lessons with power-point projections and morhological crystallography and mineralogical optics practice, together with thin sections analisys

MODULE
MINERALOGY

Prof. MARCELLO MERLI

SUGGESTED BIBLIOGRAPHY

Klein C. (2004). "Mineralogia", Ed. Zanichelli, Bologna.
Peccerillo, Perugini (2004) - "Introduzione alla microscopia ottica", Morlacchi editore
Putnis, A. (1992) "An Introduction to Mineral Sciences", Cambridge University Press

AMBIT	50175-Doiscipline di scienze della Terra
INDIVIDUAL STUDY (Hrs)	94
COURSE ACTIVITY (Hrs)	56

EDUCATIONAL OBJECTIVES OF THE MODULE

The aim of the module is to provide the theoretical and notional background necessary in acquiring a complete knowledge of the fundamentals of Mineralogy, ensuring that the student is able to transfer the basic concepts to other disciplines in the field of Natural Sciences. In particular, the basic preparation provides for the understanding of the concept of crystallographic symmetry, elementary thermodynamics (coupled with crystal chemistry, that explain the genesis and evolution of the mineralogical assemblies together with the structural stability of the mineral itself), chemical characterization of the mineral (analytical techniques and related basic principles) and physical properties. The course is integrated with a short optical mineralogy laboratory, addressed to develop the ability of the student in a thin section analysis. The course ends with the study of Systematic Mineralogy, which represents a synthesis of the basic concepts studied throughout the course, paying particular attention to the rock-forming minerals.

SYLLABUS

Hrs	Frontal teaching
1	Objectives of the Mineralogy in the natural and environmental sciences, and discussion on the disciplines in the Mineralogy framework.
6	The crystallographic symmetry and its role in the solid-state study
6	Fundamentals of crystal-chemistry
4	Elementary Thermodynamics - polymorphism
1	Crystalphysics : scalar and vectorial properties. Hardness, color, luster , cleavage , density, piezoelectricity, magnetism , thermal expansion and compressibility.
1	Mineralogical Systematics: criteria for mineral classification
2	Systematics: native elements, halides
4	Systematics: Oxydes and hydroxides
6	Systematics: Sulphides, carbonates, sulphates, phosphates
9	Classification and systematics of silicates, clay minerals and zeolites

Hrs	Practice
12	Optical mineralogy exercises and identification of the most common rock-forming minerals

MODULE
PETROGRAPHY

Prof.ssa GIOVANNA SCOPELLITI

SUGGESTED BIBLIOGRAPHY	
Morbidelli, L. - Le rocce e i loro costituenti. Bardi Editore. Peccerillo, A., Perugini, D. - Introduzione alla petrografia ottica. Con CD-ROM. Morlacchi Editore.	
AMBIT	50175-Doiscipline di scienze della Terra
INDIVIDUAL STUDY (Hrs)	94
COURSE ACTIVITY (Hrs)	56
EDUCATIONAL OBJECTIVES OF THE MODULE	
The aim of the course is to give to the student the instruments to describe and classify a rock to individuate the genetic environment allow him to evaluate the implications of its history. To this purpose will be illustrated the main methods to study rocks in laboratory and will be defined the most important igneous, sedimentary and metamorphic processes bringing to the rock formation.	

SYLLABUS

Hrs	Frontal teaching
2	Course presentation: purposes and methods.
2	The Earth: introductory concepts.
2	Reviews on the optical features of the main minerals useful for the rock classification.
6	The extrusive, intrusive and hypabyssal rocks: structures and texture, classification and petrogenesis.
8	Study of the main thermodynamic diagrams for the magmatic systems modelling.
4	The igneous rocks in the different geodynamic environments.
8	The sedimentary rocks: structures and texture, sedimentary environment and petrogenesis.
8	The metamorphic rocks: structures and texture, kinds of metamorphism.

Hrs	Workshops
1	Macroscopic identification of the main igneous rocks.
2	Identification under the polarized light microscopy of the main intrusive igneous rocks.
2	Identification under the polarized light microscopy of the main extrusive igneous rocks.
2	Macroscopic identification of the main sedimentary rocks.
2	Identification under the polarized light microscopy of the main clastic sedimentary rocks.
2	Identification under the polarized light microscopy of the main chemical, organic and organogenic sedimentary rocks.
1	Macroscopic identification of the main metamorphic rocks.
2	Identification under the polarized light microscopy of the main metamorphic rocks from a silica and clay-rich protolith.
2	Identification under the polarized light microscopy of the main metamorphic rocks from a basic or carbonate protolith.