

COURSE: Environmental and Economic Petrography			
ACADEMIC YEAR: 2016/2017			
TYPE OF EDUCATIONAL ACTIVITY: Free choice			
TEACHER: <b>Dott. Ssa Giovanna Rizzo</b>			
e-mail: <b>giovanna.rizzo@unibas.it</b>		website:	
phone: <b>0971/205833</b>		mobile (optional): <b>347/9940673</b>	
Language: ENGLISH			
ECTS: 6 CFU (4 lessons and 2 practice)	n. of hours: (32 lessons and 24 practice)	Campus: Potenza Dept. Science Program: Geoscience and Georesource	Semester: II (start 07/03/2017, stop 29/06/2017)

#### EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES

The course gives knowledge about the practical aspects of the petrography of the rocks with a focus on economic and environmental interest, such as shale, bauxite, materials for the industry (cement, mortar, etc), ceramic materials and the rocks containing asbestiform minerals. The part relating to the laboratory has the purpose to illustrate the analytical techniques used in the study of the rocks of industrial and environmental interest.

The main knowledge provided will be related to different types of stone used in construction, degradation processes and actions needed to clean, preserve and protect.

The knowledge acquired will be aimed at the characterization of geomaterials used in modern industry, such as ceramics, glass, cement and mortar.

#### PRE-REQUIREMENTS

Knowledge of Geochemistry and Petrology.

#### SYLLABUS

**1) The stone materials (2 hours): Topic 1.** Physical properties of rocks. **Topic 2.** Compressive strength, to traction, shear, creep, flexural and impact. **2) Degradation processes of stone materials (3 hours): Topic 1.** Chemical weathering, action of rain, of dust, of wind ecc. **Topic 2.** Degradation of monuments in desert climates. **Topic 3.** Alteration of a crystalline marble, of silicate rocks, ecc.. **Topic 4.** Action of fire and ice. **3) Ceramics (3 hours): Topic 1.** Investigation archaeometrical. **4) The rocks with asbestiform minerals (2 hours): Topic 1.** The asbestiform minerals **Topic 2.** Use of these rocks. **5) Bauxite (2 hours) : Topic 1.** Origin, composition and industrial use. **6) Cement (4 hours). Topic 1.** Composite and calcium alluminate cement. **7) Glass (2 hours) : Topic 1.** Chemical, physical and mechanical properties. **Topic 2.** Devitrification processes. Glass types. **8) Artificial stone (2 hours): Topic 1.** Lime, mortar, plaster, hydraulic binders. **9) Shales (2 hours): Topic 1.** Composition and industrial use. **10) Restoration of rocks on buildings and monuments (2 hours). Topic 1.** Cleaning of rocks. **11) Analytical technique (8 hours): Topic 1.** Chromatography. **Topic 2.** X-ray diffraction . **Topic 3.** Scanning electron microscopy. **Topic 4.** X-ray fluorescence. Electron microprobe. **Topic 5.** Raman Spectroscopy.

*12) Petrographic characterization of shales. (2 hours). Petrographic characterization of rocks with asbestiform minerals (2 hours). Petrographic characterization of ceramics (2 hours). Exercise with Scanning electron microscopy (2 hours). X-ray analyses (2 hours). Raman Spectroscopy analyses (2 hours). Technical visits and Field trip (12 hours).*

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TEACHING METHODS

Theoretical lessons, Laboratory tutorials, Technical visits, Field trip.

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EVALUATION METHODS

Discussion of a project work

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TEXTBOOKS AND ON-LINE EDUCATIONAL MATERIAL

Notes provided by the teacher at the end of each argument

Evans A.M. (2009) – Ore geology and industrial minerals: an introduction. Blackwell Scientific Publications, Oxford.

Paquet H. & Clauer N. (1997) – Soils and sediments (Mineralogy and Petrology), Springer.

Rollinson H. (1993) – Using geochemical data: evaluation, presentation, interpretation, Taylor and Francis.

Winter N.B. (2012) - Scanning electron microscopy of cement and concrete. Whd Microanalysis Consultants Ltd.

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INTERACTION WITH STUDENTS

Meet with students: Mondays from 17-18 hours; Tuesday from 17-18 hours; Wednesday from 17-19 hours; Thursday from 16-18 hours. In addition the teacher is available for a contact with the students, through their email.

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EXAMINATION SESSIONS (FORECAST)<sup>1</sup>

26/07/2017; 27/09/2017; 25/10/2017; 29/11/2017; 12/12/2017

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SEMINARS BY EXTERNAL EXPERTS    YES

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FURTHER INFORMATION

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