
COURSE: APPLIED and ENVIRONMENTAL MINERALOGY

ACADEMIC YEAR: 2019/2020

TYPE OF EDUCATIONAL ACTIVITY: Free choice

TEACHER: Vito Summa

e-mail: **vito.summa@imaa.cnr.it**website: <http://scienzegeologiche.unibas.it/site/home.html>phone: **0971427251**mobile (optional): **347.5717337-320.4349369**

Language: **English**

ECTS: **6**
(4 of lectures and 2 of
tutorials and practice)n. of hours: (**56**
(**32** of lectures and **24** of
tutorials and practice)Campus: **Potenza**
Dept./School: **Dipartimento di
Scienze**
Program: Geosciences and
Georisources (**LM74**)Semester: **II**
Course dates:
02/03/2020-
31/05/2020

EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES**Knowledge and understanding**

Mineral-geochemical and textural analysis and characterization of geo-environmental matrices aimed at monitoring and assessing mineralogical and geochemical risk and studying land degradation processes.

Applying knowledge and understanding

To evaluate: i) the correlation factors between geo-environmental contexts and human health, ii) proper optimization and valorization path of clay geo-materials, iii) the traditional and innovative analytical techniques useful for studying mineral matrices and fine sediments.

Making judgements

Be able to assess: i) the implications between geo-environmental contexts and human health, ii) the land degradation processes.

Communication skills

Ability to present the results of applied mineralogy and geochemistry studies in a clear and synthetic way using IT tools and appropriate scientific language.

Learning skills

Self-updating skills through the consultation of scientific texts and publications in the applied mineralogy and geochemistry sector, also with the help of the web.

PRE-REQUIREMENTS

Basic knowledge of mineralogy, geochemistry, lito-stratigraphy and technical geology.

SYLLABUS

- Role of minerals in immobilizing and releasing elements of environmental concern.
 - Study of correlation factors between geochemical, mineralogical and textural characters of fine sediments and land degradation processes (landslides, erosion and salinization).
 - Geo-environmental aspects and effects of minerals on human health: asbestiform minerals, atmospheric particulate and human pathologic bio-minerals.
 - Investigation protocols to determine mineralogical and geochemical contaminants, in natural and anthropic sites, to evaluate environmental impact.
 - Use of some mineral matrices in mud therapy, pharmacology, cosmetics and mining: limits and perspectives.
 - Geo-environmental management regulatory and legal framework.
 - Medical and environmental geology laboratory.
 - Analytical methods and techniques for the textural and mineral-geochemical characterization (diffraction, electron microscopy and particle size).
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TEACHING METHODS

Lectures, practical exercises and didactic field trips.

EVALUATION METHODS

Evaluation of learning will be carried out by oral presentation (using power point) based on the development of a pilot case with additional issues proposed by the professor. Particular attention will be given to the candidate ability to plan and identify techniques and methods for evaluating environmental risk and possible mitigation actions and valorization measures. A final discussion will be conducted to verify the overall preparation of the candidate.

TEXTBOOKS AND ON-LINE EDUCATIONAL MATERIAL

Applied Clay Mineralogy. International Series in the Earth Sciences. Grim R.E.. McGraw-Hill, 1962.

A review of Pathological Biomineral Analysis Techniques and Classification Schemes. Giannossi M.L. and Summa V.. In: "An Introduction to the Study of Mineralogy", edited by Cumhuri Aydinalp, InTech, 2012. ISBN 978-953-307-896-0.

Argille e Minerali delle Argille. Analisi dei Materiali argillosi per diffrazione di raggi X e microscopia elettronica a scansione. Teoria ed applicazioni. AISA Associazione Italiana per lo Studio delle ARGILLE - Atti del VII Corso di Formazione dell'Associazione Italiana per lo Studio delle Argille, Tito Scalo (Potenza), 2004. ISBN 88-7522-006-9.

Characterisation and Engineering properties of natural soils. Vol. 1. Tan T.S., Phoon K.K., Hight D.W., Leroueil S. Editors. A.A. Balkema Publishers, 2003. ISBN 90 5809 538 X.

Characterisation and Engineering properties of natural soils. Vol. 2. Tan T.S., Phoon K.K., Hight D.W., Leroueil S. Editors. A.A. Balkema Publishers, 2003. ISBN 90 5809 539 8.

Chemo-mechanical coupling in clays. From Nano-Scale to Engineering Applications. Di Maio C., Hueckel T. and Loret B. Editors. Balkema Publishers, 2002. ISBN 90 5809 384 0.

Clay deposits, from a problem to an economic resource for the territory: case study in southern Italy. Summa V. and Giannossi M.L.. In: "Clay: Types, Properties and Uses". Humphrey J.P. and Boyd D.E. Editors. Nova Science Publishers Inc., 2011. ISBN 978-1-61324-449-4.

Essentials of Medical Geology. Impacts of the Natural Environment on Public Health. Edited by Selinus O., Alloway B., Centeno J.A., Finkelman R.B., Fuge R., Lindh U., Smedley P.. Elsevier Academic Press, 2005.

Fundamentals of Soil Behavior. Mitchell J.K. and Soga K.. John Wiley & Sons, Inc., 2005.

Il rischio in Italia da sostanze inorganiche. Fondo naturale incontaminato e contaminato. ANPA, Agenzia Nazionale per la Protezione dell'Ambiente. ISBN 88-448-0020-9.

Incontri scientifici. Metodi di Analisi di Materiali Argillosi. AIPEA Association Internationale pour l'Etude des Argiles. Atti del V Corso di Formazione Metodi ed Analisi di Materiali Argillosi, Tito Scalo (Potenza), 1999.

Soil Chemistry. Bohn H., McNeal B., O'Connor G.A.. John Wiley & Sons, Inc., 2001. ISBN 0-471-36339-1.

INTERACTION WITH STUDENTS

The professor will make available to students the teaching materials, during the course

Professor availability: Monday through Friday, to be agreed by appointment, at professor office.

In addition to weekly days of availability, the professor is available at all times via email: vito.summa@imaa.cnr.it or tel. 3204349378.

EXAMINATION SESSIONS (FORECAST)¹

29.05.2020; 26.06.2020; 22.07.2020; 25.09.2020; 23.10.2020; 20.11.2020; 18.12.2020; 21.01.2021; 18.02.2021; 17.03.2021; 21.04.2021; 20.05.2020; 24.06.2021.

SEMINARS BY EXTERNAL EXPERTS Yes

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

FURTHER INFORMATION
