DIPARTIMENTO DI SCIENZE

COURSE: **Applied Geophysics**			
ACADEMIC YEAR: **2016-2017**			
TYPE OF EDUCATIONAL ACTIVITY: **D**			
TEACHER: **Dr. Sabatino Piscitelli**			
e-mail: **sabatino.piscitelli@imaa.cnr.it**		website: **http://www.imaa.cnr.it/**	
phone: **+39 0971427239**		mobile (optional):	
Language: **ITALIAN**			
ECTS: **6** (lessons **4** and tutorials/practice **2**)	n. of hours: **56** (lessons **32** and tutorials/practice **24**)	Campus: **Potenza** Dept./School: **Dept. of Sciences** Program: **Geological Sciences (L34)**	Semester: **I** 03/10/2016, 15-31/01/2017

EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES

The course represents the first teaching of Applied Geophysics and examines the basic elements of the main geophysical methods applied in the exploration of the subsoil, through lectures, practical exercises and field surveys. The main objective of the course is to provide to the students the basic geophysical skills to deal with the study of geological-geophysical problems, especially in the field of natural and/or anthropogenic hazards.

PRE-REQUIREMENTS

Preferably, the student should have passed the examinations or at least have attended the courses of Physics and Geology/Applied Geology

SYLLABUS

- **Introduction to Applied Geophysics**: Brief history on geophysical prospecting methods. Overview of geophysical methods. Active and passive methods. Example applications. The direct and inverse problem in applied geophysics (**2 hours**);
- **Gravimetric method**: Principles of Gravity, Gravity of the Earth, Gravity Instruments, Field Operations, Gravity Data Processing and Interpretation, Field Examples (**4 hours**);
- **Magnetic Method**: The Earth's Magnetic Field. Magnetism of Rocks and Minerals. Field Instruments for Magnetic Measurements, Field Operations, Processing and Interpretation, Field Examples (**4 hours**);
- **Electrical Methods**: Electrical Properties of Rocks and Minerals, metallic conductors, semiconductors, dielectrics (insulators): solid and liquid electrolytes. The resistivity of the rocks. The Archie's law. Classification of Electrical Methods. Self Potential Method. Resistivity Methods. Induced Polarization. Principles and elementary theory. Instruments and Field Operations. Data acquisition, processing and interpretation. Fields Examples (**10 hours**);
- **Electromagnetic methods (EM)**: Electromagnetic Theory. EM Methods: systems and Applications. TDEM, FDEM, VLF Methods. EM Equipment. EM Field Procedure. Data processing and interpretation. Field Examples (**4 hours**);
- **Seismic Methods**: Seismic Theory. Seismic Waves. Seismic Methods. Seismic Refraction surveying. Seismic Reflection Surveying. Instruments. Field Operations. Data acquisition, processing and interpretation. Field Examples (**4 hours**);
- The contribution of Applied Geophysics in the study of natural and/or anthropogenic hazards: Field Examples (**8 hours**).
- During the course, laboratory exercises and field surveys will be carried out. Geophysical equipments and data acquisition, analysis, processing and interpretation for the study of real cases will be explained (**24 hours**).

TEACHING METHODS

Theoretical lessons, Classroom tutorials (32 hours)
Laboratory tutorials, Project works, Technical visits, Field surveys (24 hours)..

EVALUATION METHODS

Oral examination.

TEXTBOOKS AND ON-LINE EDUCATIONAL MATERIAL

- Notes and slides provided by the teacher.

Textbooks:

- Sharma, P.M., Environmental and Engineering Geophysics, Cambridge University Press. (1997).

- Parasnis, D.S.: Principles of Applied Geophysics, Chapman and Hall, (1986).
- Telford, W.M., Geldart, L.P., Sheriff, R.E., Keys, D.A.: Applied Geophysics, Cambridge University Press, (1990).
- Dobrin, M.B., Savit, C.H.: Introduction to Geophysical Prospecting, McGraw-Hill International editions, (1988).
- Swan, A.R.H., Sadilands, M.: Introduction to geological data analysis, Blackwell Science (1995).
- Alan E. Mussett, M. Aftab Khan: ESPLORAZIONE DEL SOTTOSUOLO, Una introduzione alla geofisica applicata, traduzione di Franco Ricci Lucchi, 2003, 432 pagine, formato 197×270, brossura, 39,50 euro, isbn 88-08-07895-7.
- Carrara E., Roberti N. & Rapolla A.: I metodi geoelettrico e sismico per le indagini superficiali del sottosuolo, Liguori, 2012, ISBN 882075648X, 9788820756482.
- Reynolds John M.: An Introduction to Applied and Environmental Geophysics, John Wiley & Sons Inc Print on; 2 edizione (18 aprile 2011).

INTERACTION WITH STUDENTS

At the beginning of the course, after describing the objectives, program and methods of verification, the teacher provides students educational materials. Simultaneously, a list of students who intend to attend the course, together with name, matriculation number and email will be collected.

Office hours: Wednesdays from 17:00 to 18:00 at the Department of Sciences - CdS: Geological Sciences (Hall 7). In addition to weekly reception, the instructor is available at all times for a contact with the students, through their e-mail or phone.

EXAMINATION SESSIONS (FORECAST)[1]

03/02/2017, 03/03/2017, 14/04/2017, 05/05/2017, 16/06/2017, 21/07/2017, 22/09/2017, 27/10/2017, 15/12/2017

SEMINARS BY EXTERNAL EXPERTS YES **X** NO □

FURTHER INFORMATION

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