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**ACADEMIC YEAR: 2016-2017**

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**COURSE: TOPOGRAPHY, GEOGRAPHIC INFORMATION SYSTEM AND MAPPING OPERATIONS**

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**TYPE OF EDUCATIONAL ACTIVITY:** Basic course

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**PROFESSOR:** Carlo Manera

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**Phone:** 0971 205405

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**Language:** Italian

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**ECTS:** (lessons /  
tutorials/practice): 12

**n. of hours:**  
36 hours of theory  
lessons  
18 hours of practice

**Campus:** Potenza  
**School:** SAFE  
**Program:** LM Forest and  
Environmental Sciences

**Semester:** II

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#### **EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES**

The aim of the course is to provide the basic knowledge of geodesy, 3D surveying and mapping. This knowledge is essential to design a topographic survey, to perform measurements and to analyze the accuracy of the results. The reading of the Italian official cartography and the knowledge of the relative accuracy in different scales; the structure of the GPS and its applications; the use of digital mapping and geographic information systems; the surveying methods of rural buildings.

The student will acquire: skills to design a topographic survey, to perform the measurements and to analyze the accuracy of the results; the knowledge of the main cartographic products available for the construction and the management of geographic information system; the methods for the detection and representation of rural buildings.

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#### **PREREQUIREMENTS**

- The student must have a solid background in mathematical analysis and geometry.

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#### **SYLLABUS**

##### **Lessons**

CFU-1: Geometrical optics references; topographical survey; 3D surveying and mapping: surveying schemes and operating methods (direct and indirect measurements of distances, angles measures, intersections, survey traverse).

CFU-2: altitude detection: geometric leveling, measurements of the areas; general concepts of geodesy, main cartographic representations; Italian official cartography.

CFU-3: GPS and its applications; the digital cartography; aerial and terrestrial photogrammetry.

CFU-4: geographic information systems; surveying methods and representation of rural buildings.

CFU-5 (classroom exercises and laboratory): use of surveying instruments (squares, levels, total station) reading topographic maps.

CFU-6 (field exercises) execution of a planimetric survey detail and relative graphic restitution; surveying and compensation of a closed traverse.

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##### **Practices**

Use of surveying instruments (squares, levels, theodolite, total station) reading topographic maps, execution of a planimetric survey detail and relative graphic restitution; surveying and compensation of a closed survey traverse.

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#### **TEACHING METHODS**

The course includes 36 hours of theory lectures and 18 hours of laboratory exercises and on site. During the exercises in the classroom or laboratory students, also organized into groups, will use various surveying instruments for measuring angles, distances and height differences, analyze the official cartography in different scales for reading the content and analysis of the accuracy of the measurements, while on site, in groups, they will carry out the measures for the implementation of a closed traverse and a detailed survey with relative graphic restitution.

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#### **EVALUATION METHODS**

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Oral examination at the end of the course.

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#### TEXTBOOKS AND ON-LINE EDUCATIONAL MATERIAL

- Teaching material distributed in classroom
  - G. Bezoari, C. Monti, A. Selvini, Fondamenti di rilevamento generale – Topografia e Cartografia – vol. I, Hoepli, Milano 1989
  - R. Barzaghi, L. Pinto (2015): Topografia e cartografia, CittàStudi Edizioni
  - B. Guandalini, G. Salerno (2013): Manuale ArcGIS 10, Flaccovio Editore, Palermo
  - L. Biagi (2009): I Fondamentali del GPS, download gratuito dal sito <http://geomatica.como.polimi.it/fondamentaligps/>
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#### INTERACTIONS WITH STUDENTS

- Office hours for consultation: at specific days/hours (usually on Wednesday)
  - email, skype
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#### PLANNED EXAMINATION SESSIONS

Calendar available online:

<https://unibas.esse3.cineca.it/Home.do>

Usually the third Wednesday of each month (except August)

#### EVALUATION BOARD

Carlo Manera  
Pietro Picuno  
Carlo Sivolella  
Donato Castronuovo

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SEMINARS BY EXTERNAL EXPERTS YES

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