



# *Dipartimento di Scienze e Tecnologie*

ACCADEMIC YEAR 2017/2018

STUDY COURSE in **Geological Sciences**  
TEACHING **EARTH SYSTEM**  
**Mod. A - CARTOGRAPHY & GIS**

TEACHER **Prof. Filippo RUSSO**

PROGRAM OF THE COURSE  
**CARTOGRAPHY & GIS**  
First year - first semester

## **Introduction**

Purposes and methods of Cartography; the shape of the Earth: ancient and modern concepts; general information on the methods of representation of the earth's surface: the globes and maps.

## **Elements of Geodesy**

Evidence of the sphericity of the Earth. The Ellipsoid of rotation, the Geoid, the Polyhedron terrestrial; measuring the circumference of the Earth: the Experience of Eratosthenes; the size of the Earth. The orientation and the Cardinal points; the Sun's path and geographical landmarks; the wind rose and the magnetic compass; the polar coordinates. Netting geographic: Meridians and Parallels. The Geographic coordinates: Latitude and Longitude; methods and tools for the determination of Latitude; Analemma and the measurement of solar declination. Methods for the determination of Longitude.

## **Elements of Cartography**

The Geographic maps and their classification. Concepts of equidistance, equivalence and Isogonia or Conformity. Methods to representing the Earth surface: the geographical projections.

Classification of Geographical projections: Real and Conventional Projections. Projections true: classification and general features. Projections and perspective Azimuth: typological characteristics, uses and limitations. Projections of development: typological characteristics, uses and limitations. Isogonic maps obtained from true projections; the rhumb line and great circle line. Projections conventional: classification and general features. Pseudocylindric and pseudoconical projections: methods of construction and main typological characteristics. The trapezoidal projection. The Policonical, polyhedral or polycentric Projections: methods of construction and the main types. Interrupted and stellar Projections: construction mode and the main types.

The Topographic Map of Italy: general characteristics and type of projections used; the Gauss-Boaga projection; cartographic overlapping areas in Italy; the Gauss-Boaga representation of map grids in the Topographic Map of Italy: meridians and parallels. Methods for determining the geographical position of a point in the map. Definition and scope of the Km reticulate; relationships between geographic and chilometric netting; definition of the Area, Jersey and Designation of a point in the kilometer netting. Coordinates U.T.M. the Topographic Map of Italy: method of determining the Designation of a point. The IGMI Topographic Map of Italy: old and new map production. Name of cartographic production. Orientation problems in the Topographic Map of Italy; magnetic north and magnetic declination; The map Convergence and the North of UTM Reticulate. Definitions of map and Scale of the map.



# *Dipartimento di Scienze e Tecnologie*

The symbols in the IGMI official cartography: conventional symbols. Planimetric symbols: various types and methods for mapping; international and traditional legends. The elevation symbols: types and classification. The symbolism elevation in historical maps. The contour lines: definition, types and methods of construction. The scriptures. Determination of the slope and its angular value in the contour lines maps. Determining the elevation of a point interposed to contour lines. Mode of representation of the third dimension of the relief using contour lines: the elevation profile.

## **Elements of digital Cartography and Geographic Information Systems**

The forms of modern evolution of Cartography: numerical or digital mapping and Geographic Information Systems or GIS. Differences between Geographic Information Systems (GIS) and SIT. Practical guide to the use of most popular GIS Desktop. The WebGIS. Operations and functions commonly used in GIS.

## **Textbook references**

MORI - Le carte geografiche - Ed. Libreria Goliardica  
ARUTA-MARESCALCHI - Cartografia. Lettura delle carte - Ed. Flaccovio  
CAMPBELL - Introduzione alla cartografia - Ed. Zanichelli  
LAVAGNA – LUCARNO – Geocartografia – Ed. Zanichelli  
CETRARO - GIS per la Cartografia e l'Analisi territoriale – Ed. EPC

P.S. - The exam includes a written test in which the student must show itself capable of successfully perform simple exercises cartography. It is recommended, therefore, the purchase of at least one topographic map IGMI (Scale 1: 25,000). Passing the written test is a prerequisite for the final exam consisting of an oral interview.