



## **EARTH SYSTEM**

**(Mod. A) - Cartography and G.I.S.**

### **TEACHING SCHEDULE**

<b>University degree course</b>	<b>Corso di Laurea in Scienze geologiche</b>
Teaching Name:	<b>Earth System (Mod. A) - Cartography and G.I.S.</b>
Number of Credits:	<b>6 (Six)</b>
Semester:	<b>First</b>
Teacher Title:	<b>Prof. Filippo Russo</b>
PhD students / research assigners who carry out didactic activities to support the course:	
Reception hours:	<b>Monday, Tuesday, 11 - 13 a.m., after appointment</b>
Address:	<b>Benevento, Via Port' Arsa, 11.</b>

#### **PRESENTATION OF THE COURSE**

The course introduces the study of classical and numerical mapping as a means of representing the earth's relief and its geographical features. It also provides a scientific, modern and up-to-date reading key on cartographic representation methods and their use for the purposes of proper territorial management. The course represents for the student the only instrument in the geological sciences to knowledge and understand the role and importance of cartography in the representation of the various phenomenologies and characteristics of the territory.

#### **THE FORMATIVE OBJECTIVES**

The goal of the course is to reach the student with a higher level of knowledge of geographic maps in general and their use to represent the Earth's surface in every form. In particular, it is intended to direct the student to the use of the most advanced mapping systems, such as GIS and SIT, to initiate it with numerical cartography to the spatial planning in the field of work and science.

The course allows the student to understand the role of mapping as a basis for knowledge of the territory and to learn that cartography is a fundamental tool for representing the phenomenologies associated with geological practice. It also allows to identify and represent forms and evolutionary modes of morphogenetic actions and processes typical of relief modeling or that work in various landscapes. The student will be able to read and derive from the map or, if necessary, put on map significant geographic elements of the survey. The theoretical and practical knowledge acquired through the course will be more than enough to put the student in a position to communicate, with appropriate terminology, the topographic and morphological characteristics of the survey and to establish with sufficient reliability and critical judgment the form and size.

#### **REQUIRED PRACTICES**

To fully understand the geomorphological dynamics of the course, the student will necessarily have previous knowledge acquired in the general geographic and mathematical/geometric fields.

### **FREQUENCY OF LESSONS**

Although not mandatory according to the University Teaching Regulations, the time attendance at the Cartography & GIS course is strongly recommended. The reason for this statement lies in the fact that the student during the course will be shown numerous examples of reading and interpreting the relief from topographic maps with concrete examples and exercises not easily obtainable otherwise. The teacher experience will facilitate the understanding of the numerical part of the cartography especially to the neophytes students in the software approach.

### **CONTENTS OF THE COURSE**

Generalities on cartographic representation methods. Elements of Geodesy: shape and size of the Earth; orientation, coordinates and geographic net. Methods and tools for determining Latitude and Longitude. Cartography elements: geographic map classification; Concepts of fidelity. Geographical projections: generality, classification, typological features, limitations and uses. The Topographic Map of Italy: general features. From the Gauss-Boaga projection to the representation of the geographic network. Methods for determining the geographical position of a point in the map. The kilometeric network and the determination of the Point on the map. Orientation and convergence issues. The cartographic production of IGMI. Map and scale definitions. The Symbology and the legends in the official I.G.M.I cartography. Reading the relief in the maps through the contour lines. Determination of sloping and angular value of a slope. Determining the height of a point interposed between contour lines. Third dimension representation mode: the altimetric profile. Elements of numerical cartography and Geographic Information Systems. Differences between Geographic Information Systems (GISs) and Territorial Information Systems (SITs). Practical guide to using the most popular GIS Desktop. WebGIS. Operations and functions commonly used in GIS.

### **DIDACTIC METHODS**

The 54-hour course (equivalent to 6 CFUs) is held in the first semester and will be conducted with traditional didactic methods. The frontal lessons will be organized so that the theoretical aspects and the cognitive and practical aspects of the student can be accessed through the visualization of cartographic and digital-numerical examples, also using the laboratory. The course will have a guiding principle that from the theoretical elements gradually and progressively will lead the student to acquire practicality and familiarity with the mapping tool.

### **REFERENCE TEXTBOOKS**

LUPIA PALMIERI-PAROTTO - Il Globo terrestre e la sua evoluzione - Ed. Zanichelli  
McKNIGHT-HESS - Geografia Fisica. Comprendere il Paesaggio - Ed. Piccin  
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  
MIGLIACCIO-CARRION - Sistemi Informativi Territoriali. Principi e applicazioni. - UTET

### **PROFIT EXAMINATION**

As the course is a 6 CFU module of the largest Earth System teaching (12 CFU), the examination will end with an oral exam that will have as a prerequisite for access a written test in which the student must be able to perform correctly simple mapping exercises. The student will therefore be invited to have his own topography I.G.M.I. map (Scale 1: 25,000) on which to practice. Exceeding the test is therefore a prerequisite for ending the final exam that consists of an oral interview that will also address topics relevant to Module B of the Earth System teaching even on subjects covered by the Cartography & GIS course. The oral exam will result in an appropriate level of achievement of the

course's learning objectives, both in terms of knowledge and in the skills learned. The interview is compulsory and applies to all types of students, it aims to evaluate the theoretical/practical and descriptive knowledge of the student as well as the appropriateness of the terminology used, the relevance of the answers to the questions, the ability to bring examples and make connections, language property and overall expressive ability.

## CALENDAR EXAMS

See the link

## BOOKING EXAMS

See the link

## SYLLABUS

Arguments	Hours	Bibliographic references	Type of lesson
Generalities on cartographic representation methods.	4	CAMPBELL - Introduzione alla cartografia - Ed. Zanichelli	Frontal lesson
Elements of Geodesy: shape and size of the Earth; orientation, coordinates and geographic network. Methods and tools for determining Latitude and Longitude.	4	McKNIGHT-HESS - Geografia Fisica. Comprendere il Paesaggio - Ed. Piccin LUIA PALMIERI-PAROTTO - Il Globo terrestre e la sua evoluzione - Ed. Zanichelli MORI - Le carte geografiche - Ed. Libreria Goliardica	Frontal lesson
Elements of Cartography: geographic maps classification. Concepts of fidelity. Geographical projections: generality, classification, typological features, limitations and uses.	4	McKNIGHT-HESS - Geografia Fisica. Comprendere il Paesaggio - Ed. Piccin LUIA PALMIERI-PAROTTO - Il Globo terrestre e la sua evoluzione - Ed. Zanichelli MORI - Le carte geografiche - Ed. Libreria Goliardica	Frontal lesson
The Topographic Map of Italy: general features. From the Gauss-Boaga projection to the representation of the geographic network.	4	MORI - Le carte geografiche - Ed. Libreria Goliardica LAVAGNA-LUCARNO - Geocartografia - Ed. Zanichelli	Frontal lesson
Methods for determining the geographical position of a point in the map. The kilometric network and the determination of the Point on the map.	4	MORI - Le carte geografiche - Ed. Libreria Goliardica LAVAGNA-LUCARNO - Geocartografia - Ed. Zanichelli	Frontal lesson
Orientation and convergence issues. The cartographic production of IGMI.	4	Course notes prepared by the teacher	Frontal lesson
Map and scale definitions. The Symbology and the legends in the official I.G.M.I cartography. Reading the relief in the maps through the contour lines.	4	MORI - Le carte geografiche - Ed. Libreria Goliardica	Frontal lesson
Determination of sloping and angular value of a slope.	8	ARUTA-MARESCALCHI - Cartografia. Lettura delle carte -	Frontal lesson,

Determining the height of a point interposed between contour lines. Third dimension representation mode: the altimetric profile.		Ed. Flaccovio	Laboratory
Elements of numerical cartography and Geographic Information Systems. Differences between Geographic Information Systems (GISs) and Territorial Information Systems (SITs).	6	CETRARO - GIS per la Cartografia e l'Analisi territoriale - Ed. EPC	Frontal lesson, Laboratory
Practical guide to using the most popular GIS Desktop. WebGIS. Operations and functions commonly used in GIS.	12	MIGLIACCIO-CARRION - Sistemi Informativi Territoriali. Principi e applicazioni. - UTET	Laboratory