

<b>POLI</b> ESCOLA SUPERIOR TECNOLOGIA GESTÃO <b>TÉCNICO</b> <b>GUARDA</b>	<b>SUBJECT DESCRIPTION</b>	<b>MODELO</b> PED.013.03
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Course	<b>Topographic Engineering</b>					
Subject	<b>Elements of Cartography</b>					
Academic year	2023/2024	Curricular year	1st	Study period	1st semester	
Type of subject	Compulsory	Student workload (H)	Total: 112	Contact: 75	ECTS	4
Professor(s)	PhD Elisabete dos Santos Veiga Monteiro					
<input type="checkbox"/> Area/Group Coordinator <input type="checkbox"/> Head of Department	(select)		PhD Maria Elisabete Santos Soares			

## PLANNED SUBJECT DESCRIPTION

### 1. LEARNING OBJECTIVES

*Introducing the concepts related to systems of representation of Earth. Give students the basic knowledge to identify and use appropriate methods to reading and interpret maps. Provide students the concepts of Altimetry and Hydrological Cartography based in terrain morphology so as to enable them to achieve this by applying them for various purposes.*

### 2. PROGRAMME

#### I. Introduction

- 1.1 Areas of intervention of the Topographic Engineering in one territory.
- 1.2 General notions of plane trigonometry.
- 1.3 Study triangles, theorems and properties.
- 1.4 Angular measurement systems, definition and conversion of values between those systems.

#### II. Coordinate Systems

- 2.1 Fundamentals of size and shape of the Earth.
- 2.2. Reference Surfaces.
- 2.3 Concept of Datum.
- 2.4 Planimetric and Altimetric Data.
- 2.5 Geographic Coordinate Systems.
- 2.6 Cartesian Coordinate Systems.
- 2.7 Rectangular Plane Coordinate Systems.

#### III. The topographic map

- 3.1 Concept map.
- 3.2 Types of maps and their respective coordinate systems.
- 3.3 Perception and symbolism.
- 3.4 Planimetry and Altimetry.
- 3.5 Collection and compilation of data.
- 3.6 Cartographic series of National Mapping.
- 3.7 Borders information.
- 3.8 Contour interval natural and graphics.
- 3.9 National Institutions producing mapping basis.
- 3.10 Opensource cartographic data versus authoritative data.

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#### IV. Reading and interpreting topographic maps

- 4.1 Landforms – its definition.
- 4.2 Contour – its definition.
- 4.3 Cartographic Design.
  - 4.3.1 Implantation of contour lines.
  - 4.3.2 Determining height of a point between two contour lines.
  - 4.3.3 Tracing topographic profiles.
  - 4.3.4 Tracing visibility maps.
- 4.4 Approach to the use of Digital Terrain Models (DTM), used in hydrological applications.
- 4.5 Practical applications.

#### V. Basins

- 5.1 Concept.
- 5.2 Hydrographic networks.
  - 5.2.1 Geometric characteristics.
  - 5.2.2 Relief characteristics.
  - 5.2.3 Characteristics of the drainage network.
- 5.3 Delineation of watersheds.
- 5.4 Hierarchy of hydrographic networks
- 5.5 Practical applications.

### 3. COHERENCE BETWEEN PROGRAMME AND OBJECTIVES

*The contents of the curricular unit aimed to provide the student with knowledge and skills to read and interpret charts, to know, define and identify the systems of representation of the Earth and assimilation of hydrological concepts directly related to the relief of the surface. For this reason, the program of the course includes topics and techniques to be learned that will enable students to achieve these skills and develop them in an individual and autonomous way.*

### 4. MAIN BIBLIOGRAPHY

- [1] Notes to support the course available and prepared by the teacher.
- [2] Gaspar, J. A., “*Cartas e Projeções Cartográficas*”, Lidel – Edições Técnicas, Lda, 2005.
- [3] Instituto Geográfico do Exército, “*Manual de Leitura de Cartas*”, 2004.
- [4] Gaspar, J. A., “*Dicionário das Ciências Cartográficas*”. Lidel – Edições Técnicas, Lda, 2008.
- [5] Cruz, J., “*Manual do Engenheiro Topógrafo*”, 2004, Lisboa.
- [6] Casaca, J., Matos, J., Baio, M., “*Topografia Geral*”. Lidel – Edições Técnicas, Lda, 2000.
- [7] Gonçalves, J. A., Madeira, S., Sousa, J. J., “*Topografia Conceitos e Aplicações*”. Lidel – Edições Técnicas, Lda, 2008.

### 5. TEACHING METHODOLOGIES (INCLUDING EVALUATION)

- *Oral exposition and teaching content with using media. Solving practical problems related to program content. The contents are availability in e-learning.*
- *The session frequency consists in performing a test-theoretical and practical and a practical work whose weight for the final grade of curricular unit must be at least 20%.*

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- *The season exams (normal and special) consist in performing a test-theoretical and practical whose weight for the final grade of curricular unit is 100%.*

## 6. COHERENCE BETWEEN TEACHING METHODOLOGIES AND OBJECTIVES

*Due to the goals of curricular unite (cu) are of the theoretical framework and other practical, the curricular unit has 45 hours of theoretical-practical and 30 hours of laboratory practice. The hours of theoretical practices allow students to assimilate theoretical concepts, but also take notice of examples of applications. The 30 hours of laboratory practice are intended to provide students with techniques to make applications under the guidance and supervising of the teacher.*

## 7. ATTENDANCE

*To be admitted to the evaluation process, students must attend as least 75% of the total number of classes.*

## 8. CONTACTS AND OFFICE HOURS

### **Professor:**

*Email: emonteiro@ipg.pt; Office number 74*

*Office hours of the Professor:*

*Wednesday: 11h:30 to 12h:30m*

*Thursday: 16h:30m to 18h :30m*

*Friday: 17h 30m to 18h 30m*

### **Area coordinator:**

*Email: esoares@ipg.pt; Office number 71*

## 9. OTHERS

*To ensure the proper functioning of curricular unit and for students to take advantage of content exposing during classes, after exposure of the topics should show an attitude of participation and involvement in the dynamics of class, performing questions, comments or even presenting ideas in solving the problems presented by professor. Due to the use of different types of equipment during classes, it is recommended that the handling is carried out with care and attention.*

## DATE

**21 de setembro de 2023**

## SIGNATURES

*Professor(s), Area/Group Coordinator or Head of Department signatures*

Professor

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(signature)

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Area/Group Coordinator

(signature)