

<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>TOPOGRAPHY II</b>					
Academic year	2023/2024	Curricular year	1st	Study period	2nd semester	
Type of subject	Compulsory	Student workload (H)	Total: 196	Contact: 75	ECTS	7
Professor(s)	PhD ELISABETE DOS SANTOS VEIGA MONTEIRO					
<input checked="" type="checkbox"/> Area/Group Coordinator <input type="checkbox"/> Head of Department	(select)		PhD MARIA ELISABETE SANTOS SOARES			

## PLANNED SUBJECT DESCRIPTION

### 1. LEARNING OBJECTIVES

The main objectives of the curricular unit are to enable graduates to design, measuring, calculating and adjusting the topographic networks to support civil engineering works. The students should be knowing the methods that allow performing surveys and how to perform monitoring surveying and topometric surveys.

### 2. PROGRAMME

#### I. Traverse

- 1.1 Guidelines for setting polygonal.
- 1.2 Polygonal networks.
- 1.3 Classification of polygonal.
- 1.4 Methods for calculating and compensation polygonal.
- 1.5 Accuracy in measuring angles and distances.
- 1.6 Application of traverse method to engineering works.

#### II. Distance measurement

- 2.1 Direct methods.
- 2.2 Indirect methods.
- 2.3 The accuracy in distance measurement.
- 2.4 Electronics measurements of distances.
- 2.5 Measurements of laser distances.

#### III. Topographic leveling

- 3.1 Leveling methods
  - 3.2.1 Barometric Leveling
  - 3.2.2 Trigonometric or geodetic leveling  
Instrumentation.

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*Calculation of the difference in level for distances less than 500 meters.*

*Calculation of the difference in level for distances greater than 500 meters.*

### 3.2.3. Geometric leveling

*Study of levels.*

*Setup conditions*

*Leveling networks*

*Calculation and compensation of leveling networks.*

## **IV Topographic surveys**

### 4.1 Classic Method

*4.1.1 Topographic survey planning.*

*4.1.2 Creation and establishment of the topographic control networks.*

*4.1.3 Detail topographic survey*

### 4.2 Aerophotogrammetric Method

### 4.3 Land and Aerial Laser Scanning Systems

### 4.4 Unmanned Aerial Vehicles (UAV)

## **V Topometry**

### 5.1 Definition

*5.2 Approach to topographic monitoring in engineering works.*

### 5.3 Methods used

## **VI Initiation to the study of the total station**

### 6.1 Introduction

*6.2 Principles of use.*

*6.3 Programs and functions.*

## **3. COHERENCE BETWEEN PROGRAMME AND OBJECTIVES**

*With this course is intended to confer powers mainly in the conception, observation, calculation and adjustment of support topographic networks, which serve as the basis for various construction projects.*

*The syllabus, consider the study and the applicability of the methods to be used for this purpose.*

*Furthermore, this course lectured the methodologies for performing a topographic survey, by classic and photogrammetric manner.*

## **4. MAIN BIBLIOGRAPHY**

*[1] Notes and other types of teaching content provided by the teacher.*

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[2] Cruz, J., “Manual do Engenheiro Topógrafo”, 2004, Lisboa.

[3] Casaca, J., Matos, J., Baio, M., “Topografia Geral”. Lidel – Edições Técnicas, Lda, 2000.

[4] Gonçalves, J. A., Madeira, S., Sousa, J. J., “Topografia Conceitos e Aplicações”. Lidel – Edições Técnicas, Lda, 2008.

[5] Gaspar, J. A., “Cartas e Projeções Cartográficas”, Lidel – Edições Técnicas, Lda, 2005.

[6] Instituto Geográfico do Exército, “Manual de Leitura de Cartas”, 2004.

[7] Gaspar, J. A., “Dicionário das Ciências Cartográficas”. Lidel – Edições Técnicas, Lda, 2008.

## 5. TEACHING METHODOLOGIES (INCLUDING EVALUATION)

- *Oral presentation, teaching of program content using audiovisual media. Resolution of problems related to syllabus. Provision of program content and calculation steps on an e-learning platform.*
- *The final classification by frequency is based on carrying out a practical theoretical test with a weight of 60%, carrying out two practical assignments with a weight of 25% and carrying out some practical exercises with a weight of 15%.*
- *The final classification of the curricular unit by exam (normal, appeal or special) is based on carrying out a theoretical-practical test that will have a weight of 75% and the execution of practical work with a weight of 25%.*

## 6. COHERENCE BETWEEN TEACHING METHODOLOGIES AND OBJECTIVES

*To conceive, to observe, calculate and adjust topographic networks are needed well as theoretical concepts, practical concepts, for this reason the curricular unit have 30 hours of laboratory practice which will allow students to practice analytical calculation and adjustment of surveying networks. The curricular unit also has 30 hours of field work that allow the student (student group) to develop proposals in the field surveying applications. Therefore, the teaching methodologies adopted provided students with skills that curricular unit confers and are in accordance with the objectives.*

## 7. ATTENDANCE

*To be admitted to the evaluation process during semester, the 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;*

*Time of attendance:*

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*Wednesday: 11:30 AM to 12:30 AM*

*Thursday: 4:30 PM to 6:30 PM*

*Friday: 5:30 PM to 6:30 PM*

Scientific area coordinator: Email: [esoares@ipg.pt](mailto:esoares@ipg.pt); Office number 71

**9. OTHERS**

*To ensure the proper functioning of the course, and for students to make the most of the contents lected during classes, after exposure the subjects, 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. Because students use the various equipment during lessons, advised to be handled with care and attention, and shall meet for the purpose request a bookmark that is in the Office of Topography..*

**DATE**

**21 de setembro de 2023**

**SIGNATURES**

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

Professor

\_\_\_\_\_  
(signature)

Area/Group Coordinator

\_\_\_\_\_  
(signature)