

## Course file

<b>Study cycle</b>	BACHELOR IN CIVIL ENGINEERING		
<b>Course</b>	Topografia	Mandatory	<input checked="" type="checkbox"/>
		Optional	<input type="checkbox"/>
<b>Course scientific area</b>	CIVIL ENGINEERING	Category	B

Course category: B - Basic; C - Core Engineering; E - Specialization; P - Complementary.

Year: 2nd	Semester: 3rd	ECTS: 5,5	Total: 149
Contact time	T: 22,5	TP: 45	PL: S: OT:

T - Lectures; TP - Theory and practice; PL - Lab Work; S - Seminar; OT - Tutorial Guidance.

Course Director	Title	Position
Armando António Pereira Teles Fortes	Especialista	Professor Coordenador

### Learning objectives (knowledge, skills and competences to be developed by students)

(max. 1000 characters)

This course will enable students to understand the fundamental basics of Topography, in particular:  
 Understand the concepts of Geodesy and Mathematical Cartography;  
 Acquire and apply knowledge needed for the development of Civil Engineering projects in terms of coordinated calculation;  
 Perform leveling operations, topographic surveys and implantation of polygonal;  
 Assimilate the cartography producing process from aerial photographs;  
 Acquire basic knowledge about spatial positioning through the global positioning system (GPS).

### Syllabus

(max. 1000 characters)

Geodesy and Mathematical Cartography - reference geodetic systems.  
 Topography appyed to Civil Engineering projects.  
 Vertical control, direct leveling.  
 Topographic surveys and analytical methods of points coordination.  
 Cartographic conventions.  
 New technologies of topography survey and of positioning.  
 Aerial and terrestrial photogrammetry.

### Demonstration of the consistency between the syllabus and the course objectives

(max. 1000 characters)

The course of Topografia presupposes that the students acquire the fundamental basics of Topography, allowing the interpretation of cartography and the knowledge associated with different methods to obtain cartography. It can also perform and control leveling operations and topographic surveys and implantation of a polygonal.

The syllabus cover the geodesy, the design, the works done to connect to natural terrain and to civil constructions, as well as methodologies for producing cartography, framing in the objectives aimed for course.

### **Teaching methodology (evaluation included)**

(max. 1000 characters)

In the theoretical lessons, it is used the expositive method, using the tableau and exposition of theoretical concepts in the classroom, and informatic support. In addition to the expository method it is used various techniques that will develop logical reasoning of the students, such as brainstorming for the problem solving. The TP lessons are taught based on the resolution of problems concerning analytical coordination of points and monitoring of practical assignments.

Assessment: global theoretical test (minimum grade of 9,5 val.) and two practical assignments (minimum individual grade of 9,5 val.). The final mark of the course is given by the arithmetic mean of the grade of the test (50%) and of the two practical assignments (50%). The grade of the test can be replaced by the grade obtained in the examination, which will be alternately used in the arithmetic mean with the grade of the two practical assignments to obtain the final mark.

### **Demonstration of the consistency between teaching methodology and the course learning objectives**

(max. 3000 characters)

Theoretical lessons and TP lessons, as well as the methodology used in the knowledge assessment intended to achieve specifically the learning objectives through the test and the two practical assignments that are subject to assessment. Thus, students can more easily understand the concepts of geodesy and mathematical cartography, cartography production based on aerial photographs and basic knowledge about spatial positioning, and apply that knowledge to the development of coordinated calculation in Civil Engineering projects. It is also conducted field/office assignments, involving the leveling operations and implantation of a polygonal and topographic survey, pointing to another of the learning objectives of the course.

### **Main Bibliography**

(max. 1000 characters)

Casaca, J.; Matos, J., Baio, M., "Topografia geral", Lidel, 5ª edição, 2005;  
Gonçalves, J.A.; Madeira, S.; Sousa, J.J., "Topografia", Lidel, 2ª edição, 2012;  
Instituto Geográfico do Exército, "Noções gerais de geodesia", Instituto Geográfico do Exército, 1ª edição, 2000;



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Instituto Geográfico do Exército, "Sistemas de referência", Instituto Geográfico do Exército, 3ª edição, 2004;  
Matos, J., "Fundamentos de informação geográfica", Lidel, 5ª edição, 2008;  
Gaspar, J.A., "Cartas e projecções cartográficas", Lidel, 3ª edição;  
Curso de Formação Complementar de Topografia Aplicada a Vias de Comunicação / ISEL/ 1998, publicações de apoio (autores vários);  
Fonseca e Costa, Cadernos Técnicos do IPCC.  
Carvalho Xerez, Topografia Geral.