

Course Unit	Topography and Cartography		Field of study	Earth Sciences	
Bachelor in	Environmental Engineering		School	School of Agriculture	
Academic Year	2022/2023	Year of study	1	Level	1-1
Type	Semestral	Semester	2	ECTS credits	6.0
Code	9099-309-1205-00-22				
Workload (hours)	162	Contact hours	T -	TP 60	PL -
			TC -	S -	E -
			OT 20	O -	

T - Lectures; TP - Lectures and problem-solving; PL - Problem-solving, project or laboratory; TC - Fieldwork; S - Seminar; E - Placement; OT - Tutorial; O - Other

Name(s) of lecturer(s) **Arlindo Castro Ferreira Almeida, João Paulo Miranda Castro**

Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:

1. know the systems of representation of the Earth. Know and apply different systems of geographical and cartographic coordinates
2. Interpret forms of cartographic representation of the Earth.
3. Calculate distances, slopes, areas and volumes of land, in cartographic representations. Draw topographic profiles. Use apparatus to measure physiographic parameters.
4. Know equipment used in topographic surveys. Carry out topographic surveys.
5. Carry out perimeter surveys using Differential Global Positioning Systems (DGPS) (post-processing and real-time differential correction). Handle the vector files using CAD.
6. The student is expected to have acquired skills in orthophotography and other remote sensing data (satellite imagery) in thematic cartography and geometric cadastre.

Prerequisites

Before the course unit the learner is expected to be able to:

1. Have basic knowledge on physics, trigonometry, optics and informatics.
2. Basic knowledge on biology.
3. Basic knowledge on informatics and ecology.

Course contents

Methods of earth representation. Use of topographic charts and maps. Cadastral mapping and thematic mapping. Photogrammetry methods. Stereoscopy. Photointerpretation. Computer aid design and GPS.

Course contents (extended version)

1. Representation of the Earth's surface.
 - Shape and size of the Earth.
 - Coordinate systems. Cartographic projection system.
2. Processes of relief representation. Maps handling
 - measuring distances and areas, determination of volumes
3. Planimetry and altimetry. Methods of surveying. Leveling.
4. Notions of land registration: concepts, definitions and legislation.
5. Photogrammetry and photointerpretation.
 - Photogrammetry methods.
 - Stereoscopy
 - General approach to image interpretation and its applications.
 - Thematic mapping
6. Computer Aided Design 2D. GPS.

Recommended reading

1. JOSÉ GONÇALVES; SÉRGIO MADEIRA; J. JOÃO SOUSA (2008) TOPOGRAFIA - Conceitos e Aplicações - Lidel Edições Técnicas, Lisboa.
2. JOÃO CASACA, JOÃO MATOS, MIGUEL BAIO (2005) TOPOGRAFIA GERAL - Lidel Edições Técnicas, Lisboa
3. FRANCISCO D. GARCIA-TEJERO (1998)- Topografía General Y Aplicada, Mundi-Prensa
4. LILLESAND AND KIEFFER (2009) Remote Sensing and Image Interpretation

Teaching and learning methods

Four-hour lectures with labs integrated, sometimes in a computer laboratory. Theoretical introduction during about 20 minutes followed by practical applications using tutorial models and supervision from the instructor. Some of the classes outdoors.

Assessment methods

1. Alternative 1 - (Regular, Student Worker) (Final, Supplementary)
 - Practical Work - 50% (Evaluation of technical reports and practical tests)
 - Final Written Exam - 50% (Final written exam)
2. Alternative 2 - (Student Worker) (Final, Supplementary, Special)
 - Final Written Exam - 100% (Theoretical and practical written exam (6 ECTS credits))
3. Alternative 3 - (Regular) (Special)
 - Final Written Exam - 100% (Theoretical and practical written exam)
4. Alternative 4 - (Student Worker) (Final, Supplementary)
 - Practical Work - 50% (The same obligations and the same rights as ordinary students = Alternative 1.)
 - Final Written Exam - 50% (The same obligations and the same rights as ordinary students = Alternative 1.)

Language of instruction

Portuguese, with additional English support for foreign students.

Electronic validation

Arlindo Castro Ferreira Almeida, João Paulo Miranda Castro	José Manuel Correia Santos Ferreira Castro	Artur Jorge de Jesus Gonçalves	José Carlos Batista Couto Barbosa
19-12-2022	19-12-2022	20-12-2022	21-12-2022