POLI ESCOLA SUPERIOR TECNOLOGIA GESTÃO TÉCNICO GUARDA	**SUBJECT DESCRIPTION**	**MODELO** PED.013.03

Course	**Topographic Engineering**					
Subject	**Photogrammetry I**					
Academic year	2023/2024	*Curricular year*	1st	*Study period*	1st semester	
Type of subject	Compulsory	*Student workload (H)*	Total: 154	Contact: 60	*ECTS*	5.5
Professor(s)	André Garcia Vieira de Sá					
☒ *Area/Group Coordinator* ☐ *Head of Department* *(select)*	Maria Elisabete Santos Soares					

PLANNED SUBJECT DESCRIPTION

1. LEARNING OBJECTIVES

It is intended that the student grasps the fundamental concepts of photogrammetry, such as the perception of the geometry inherent in the photography and acquire skills to the level of stereoscopic photointerpretation. Understand the cartographic production processes by classical photogrammetry and Unmanned Aerial Vehicles (UAV). Understand and perform the extraction of geometric information and semantic from aerial photographs to prepare topographic maps and establish the geographical basis of Geographic Information Systems. Plan and develop air photogrammetric coverage in accordance with technical specifications.

2. PROGRAMME

- Principles of Photogrammetry
- Historical Overview
- Applications and areas of intervention
- Study of instrumentation for the acquisition of photography (cameras, lenses, and films)
- Optics and Photography
- Geometry of Photography
- Types of Photography
- Monocular and binocular vision
- Stereoscopy
- Study of the errors present in the photographs
- Displacement due to relief
- Parallax and floating marks
- Calibration of the air chamber
- Elementary operations: Guidance internal, external, relative and absolute

- Planning aero-photogrammetric coverage in accordance with the technical regulation
- Acquisition and processing of planimetric data obtained from photographs
- Selection and location of points of support
- Photogrammetric Triangulation
- Integration of CAD technologies, GPS and Inertial systems
- Introduction to Airborne LiDAR technology
- Classical Photogrammetry VS UAV Photogrammetry
- UAV mapping

3. COHERENCE BETWEEN PROGRAMME AND OBJECTIVES

The initial contents are devoted to basic concepts of Photogrammetry and a historical analysis of its evolution followed by an analysis of the various specific areas of photogrammetry. The related concepts required to understand stereoscopy, parallax, and other contents are studied, including cameras, lenses, and photography. This fundamental knowledge enables students to work through the stages of planning and executing aerial-photogrammetric coverage in accordance with technical specifications so that students understand all the processes in the production of photogrammetric mapping (classic and by UAV).

4. MAIN BIBLIOGRAPHY

Various material (published articles, opinion articles, company websites and videos) on classical and drone photogrammetry are made available by the teacher during the classes.

Redweik, P., "Fotogrametria Aérea", AEFCL, 2007.

Berberan, A., "Elementos de Fotogrametria – Aplicada à aquisição de informação geográfica", Cambridge University Press, 2003.

Falkner, E., "Aerial Mapping – Methods and Applications", CRC Press Company,2002.

Gosh, S., " Analytical Photogrammetry". Pergamon Press, 1979.

Press Release from ASPRS (American Society of Photogrammetry and Remote Sensing).

5. TEACHING METHODOLOGIES (INCLUDING EVALUATION)

Theoretical and practical expository method; Use of audiovisual media; Preparation of spreadsheets; Provision of content through digital platforms (Sigarra and Moodle); Presentation of papers and discussion of exercises.

It is mandatory to carry out the practical work for the student's admission to the normal assessment period.

Final grade = 80% Written test + 20% Practical work.

Students submitted to assessment and who have done the work need to obtain at least a score of 8 in the written test.

In resource and special seasons exams, practical works are optional. However, and given that they are carried out based on the contents taught, the subjects covered in these works will be evaluated in the respective tests through a supplementary question (s).

6. COHERENCE BETWEEN TEACHING METHODOLOGIES AND OBJECTIVES

This curricular unit aims to prepare students for the discipline of Photogrammetry II, so it is more theoretical than Photogrammetry II. All concepts and principles are taught and put into practice by solving worksheets. It is intended that students understand all the processes from the planning stages to final products offered by photogrammetry.

7. ATTENDANCE

No attendence regime.

8. CONTACTS AND OFFICE HOURS

Email: andre_sa@ipg.pt

Office number: 78

Attendance hours: Thursdays (4h30 PM – 6h30 PM) and Fridays (2h30 PM – 4h00PM)

DATE

26 de outubro de 2023

SIGNATURE

Professor

Assinado por: **André Garcia Vieira de Sá**
Num. de Identificação: 11904887
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