Course guide
310640 - 310640 - Terrestrial and Uav Photogrammetry

Last modified: 06/02/2024

Unit in charge: Barcelona School of Building Construction
Teaching unit: 751 - DECA - Department of Civil and Environmental Engineering.

Degree: BACHELOR'S DEGREE IN GEOINFORMATION AND GEOMATICS ENGINEERING (Syllabus 2016). (Optional subject).

Academic year: 2023 **ECTS Credits:** 4.5 **Languages:** Spanish

LECTURER

Coordinating lecturer: FELIPE BUILL POZUELO

Others: FELIPE BUILL POZUELO

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Generical:
5. Use of teams and instrumental: Capacity to select the necessary ressources to the achievement of the planned goals according to the quality requirements. Use of the teams, in adequated conditions, with professional efficiency and taking into account the limitations of the instruments and its context of use, in relation with the required precissions.

Transversal:
1. SELF-DIRECTED LEARNING - Level 3. Applying the knowledge gained in completing a task according to its relevance and importance. Deciding how to carry out a task, the amount of time to be devoted to it and the most suitable information sources.
2. TEAMWORK - Level 1. Working in a team and making positive contributions once the aims and group and individual responsibilities have been defined. Reaching joint decisions on the strategy to be followed.
3. TEAMWORK - Level 2. Contributing to the consolidation of a team by planning targets and working efficiently to favor communication, task assignment and cohesion.
4. EFFICIENT ORAL AND WRITTEN COMMUNICATION - Level 3. Communicating clearly and efficiently in oral and written presentations. Adapting to audiences and communication aims by using suitable strategies and means.

TEACHING METHODOLOGY

The directed learning hours consist of giving theoretical classes (large group), in which the teacher makes a brief presentation to introduce the general learning objectives related to the basic concepts of the subject. Subsequently and through practical exercises, it tries to motivate and involve the student to actively participate in their learning.

Support material is used through ATENEA: learning objectives by content, concepts, examples, programming of evaluation activities and directed learning and bibliography. They also consist of giving classes of problems and a laboratory in which they work, by solving exercises, problems and practices, related to the specific learning objectives of each of the contents of the subject.

In these problem / practical sessions it is intended to incorporate some generic competences.

After each session, tasks outside the classroom are proposed, which must be worked on individually and in groups.

Other hours of autonomous learning must also be considered, such as those devoted to oriented reading and solving the problems proposed on the different contents, through the virtual campus ATENEA.

LEARNING OBJECTIVES OF THE SUBJECT

At the end of the course, the student must be able to:
- Know, use and apply the techniques of treatment and analysis of spatial data
- Know, use and apply instruments and topographic and photogrammetric methods suitable for carrying out non-cartographic surveys
- Knowledge and application of least squares adjustment methods in the field of topo-geodetic, photogrammetric and cartographic observations

STUDY LOAD

Type	Hours	Percentage
Hours large group	18,0	16.00
Self study	67,5	60.00
Hours medium group	27,0	24.00

Total learning time: 112.5 h

CONTENTS

INTRODUCTION. NON-CARTOGRAPHIC PHOTOGRAMMETRY

Description:
Introduction to the terrestrial photogrammetric case. Application in architectural and archaeological surveys. Special cases

Full-or-part-time: 14h
Theory classes: 2h
Self study : 12h

GEOMETRIC FOUNDATIONS

Description:
Geometric foundations of photography. Main characteristics of terrestrial or non-topographic photogrammetry. Photographic coverages

Full-or-part-time: 15h
Theory classes: 5h
Self study : 10h

INSTRUMENTS

Description:
Instrumentation used in the different terrestrial photogrammetric methods

Full-or-part-time: 5h
Theory classes: 2h
Self study : 3h

PHOTOGRAMMETRY WITH UAV

Description:
Application of UAV (Unmanned Aerial Vehicle) systems for capturing photographs for photogrammetric purposes. Application in archaeological surveys, civil engineering, geology ...

Full-or-part-time: 8h
Theory classes: 2h
Practical classes: 4h
Self study : 2h

DERIVATIVE PRODUCTS

Description:
Obtaining 3D models of architectural, archaeological objects ...
Plans, elevations, sections ...

Full-or-part-time: 6h
Theory classes: 3h
Self study : 3h

CASE STUDY. PHOTOGRAMETRIC SURVEY

Description:
Project and execution of a large-scale, small-area photogrammetric survey

Related activities:
[ENG] Actividad 1

Full-or-part-time: 41h
Practical classes: 15h
Laboratory classes: 9h
Self study : 17h

GRADING SYSTEM

The final grade is the sum of the following partial grades:
Classroom activities: 30%
Final work report 50%
Defense of the final work 20%

Final project: Resolution of a photogrammetric work related to the architectural and/or archaeological survey (concepts associated with the learning objectives of the subject). A report of all the work and detailed plans will be provided. There will be an oral presentation of the topic developed.
Practices are mandatory. You must have completed all the practices to obtain the average grade.
Failure to complete or deliver any practice will be considered a final grade NOT PRESENTED.
There is NO make-up exam.

EXAMINATION RULES.

It is mandatory to do all the practices in order to have an average mark

BIBLIOGRAPHY

Basic:
- Ioannides, Marinos. Progress in cultural heritage preservation : 4th international conference, EuroMed 2012, Limassol, Cyprus, October 29-November 3, 2012 : proceedings [on line]. Heidelberg [etc.]: Springer, cop. 2012 [Consultation: 09/06/2020]. Available on: http://link.springer.com/book/10.1007/978-3-642-34234-9. ISBN 978-3-642-34234-9.
- Buill, Felipe; Núñez Andrés, M. Amparo; Rodríguez Jordana, Joan. Fotogrametría arquitectónica [on line]. Barcelona: Edicions UPC, 2007 [Consultation: 06/05/2020]. Available on: http://hdl.handle.net/2099.3/36829. ISBN 978-84-8301-920-7.
- Atkinson, K. B. Close range photogrammetry and machine vision [on line]. Caithness, UK: Whittles, 2001 [Consultation: 09/06/2020]. Available on: https://ebookcentral.proquest.com/lib/upcatalunya-ebooks/detail.action?docID=5311623. ISBN 978-1870325-73-8.
- Hartley, Richard; Zisserman, Andrew. Multiple view geometry in computer vision [on line]. 2nd ed. Cambridge [etc.]: Cambridge University Press, 2003 [Consultation: 25/06/2020]. Available on: https://ebookcentral.proquest.com/lib/upcatalunya-ebooks/detail.action?docID=256634. ISBN 9780521540513.

Complementary:
- McGlone, J. Ch.. Manual of photogrammetry. 5th ed. Virginia: American Society of Photogrammetry, 2004. ISBN 978-1570830716.