VNIVERSITAT DE VALÈNCIA

Course Guide
33806 Aerial and Space Remote Sensing

COURSE DATA

Data Subject	
Code	33806
Name	Aerial and Space Remote Sensing
Cycle	Grade
ECTS Credits	6.0
Academic year	2022 - 2023

Study (s)

Degree	Center	Acad. year	Period
1318 - Degree in Geography and the Environment	Faculty of Geography and History	4	First term

Subject-matter

Degree	Subject-matter	Character
1318 - Degree in Geography and the Environment	627 - Air and space remote sensing	Optional

Coordination

Name	Department
LOPEZ GARCIA, MARIA JOSE	195 - Geography

SUMMARY

The degree of Geography and Environment, the subject optional air and space remote sensing complete the student's knowledge on Geographic Information Techniques (TIG). Remote sensing techniques involve the collection and extraction of useful geographical information from the data recorded by sensors on mobile platforms (aircraft, satellites). In the course the physical principles of remote sensing study, methods of analysis and image processing, the main sensors and satellites and applications of this technique. Exercises and activities that integrate satellite imagery, aerial photography and digital mapping software using digital image processing and GIS will arise.

PREVIOUS KNOWLEDGE

Relationship to other subjects of the same degree

There are no specified enrollment restrictions with other subjects of the curriculum.

Other requirements

It is advisable to have passed the required courses on the techniques of geographic information: Cartography I and II, GIS I and II and GIS Statistics

OUTCOMES

1318 - Degree in Geography and the Environment

- Have oral and written communication skills in one's own language and in a foreign language.
- Have computer skills related to the field of study.
- Be able to work independently.
- Be able to work in interdisciplinary teams.
- Show motivation for quality, responsibility and intellectual honesty.
- Be able to produce statistical information. Know how to use statistical software.
- Have research skills.
- Learn about geographic information systems.
- Get acquainted with geographic information systems as a tool for learning about and interpreting the territory and the environment.
- Be able to relate and synthesise cross-disciplinary territorial information.
- Be able to use cartography and geographic information systems.

LEARNING OUTCOMES

General objectives:
1. Know the characteristics of the data provided by remote sensing and techniques required to extract useful information on analysis and interpretation of the territory
2. Know the main existing sensors and satellites now and its applications

Specific objectives:
1. Understanding of the basic principles of remote sensing and methodologies necessary for the processing of data
2. Develop skills for the digital satellite image processing and integration into GIS geographic information

DESCRIPTION OF CONTENTS

1. INTRODUCTION

Concept of remote sensing. Historical development. Methods and techniques

2. Physical Fundamentals

Electromagnetic radiation. Radiation laws. Spectrum of solar and terrestrial radiation. Interaction of solar radiation with the earth's surface: spectral response. Propagation of the radiation through the atmosphere. Transforming the data into physical values (reflectivity, temperature).

3. TYPES OF SENSORS

Cameras, radiometers and radars. Aerial photographs and satellite images. Concept of scale and resolution.

4. SATELLITES EARTH OBSERVATION

Geostationary and geosynchronous satellites. Main series of operational satellites, meteorological satellites and satellite resources.

5. DIGITAL IMAGE PROCESSING

Enhancement and visualization techniques (color composition, filtered). Geometric correction techniques. Spectral indices (indices of vegetation). Digital classification techniques.

6. APPLICATIONS

Applications of remote sensing for the analysis of the territory and the development of thematic mapping. Examples and case studies.

WORKLOAD

ACTIVITY	Hours	% To be attended
Theory classes	30,00	100
Computer classroom practice	15,00	100
Other activities	15,00	100
Development of group work	20,00	0
Development of individual work	20,00	0
Study and independent work	20,00	0
Preparing lectures	10,00	0
Preparation of practical classes and problem	20,00	0
TOTAL	**150,00**	

TEACHING METHODOLOGY

1) Classes:

The teacher explains the basic contents of the subject, structured in the above-mentioned topics, artwork and supported the proposal of practical exercises and activities to be developed by students individually or in groups.

2) Student work (individual):
The student develops an individual work about 6 applications following the guidelines given by the teacher.

3) Working student (group):
The student group made several practical exercises. The professor will present a guide to practice and each group will deliver a report with the results valid for evaluation.
Performing will practice during class hours and tutored (follow) contained in the annex to this guide.

EVALUATION

Evaluation is an ongoing evaluation of student work, both individually and in groups, so that the continued attendance at classes and complementary activities is essential.
The proportion of the final grade is as follows:
60% theoretical and practical examination
40% of student work (individual work and practices of group lessons)
Important:
To pass the course you must reach a minimum of 4 out of 10 in each of the parties comprising the evaluation because, otherwise, not the parties themselves will be compensated.

REFERENCES

Basic

- CAMPBELL, J.B., Introduction to Remote Sensing, Guilford Press 2007
- CHUVIECO, E., Teledetección ambiental : la observación de la Tierra desde el espacio , Ed. Ariel, 2002, 586p
- CHUVIECO, E., Fundamentos de teledetección espacial. Madrid: Ediciones Rialp, S.A., 3ª ed.1996, 453 p.
- LILLESAND, T.M., KIEFER, R.W. y CHIPMAN, J..W. Remote sensing and image interpretation, John Wiley & Sons, 2004.
- LO, C.P., Applied remote sensing. Longman Sientific & Technical, 1986, 393 p.
- SOBRINO, J.A. (Editor), Teledetección, Universitat de Valencia, 2000, 467 pp.

Additional

- Asociación Española de Teledetección : http://telenet.uva.es
- Asociación Geógrafos Españoles (AGE) : Grupo de Métodos Cuantitativos, SIG y Teledetección: http://www.age.es
- Revista: International Journal of Remote Sensing, Taylor and Francis Ltd., Reino Unido.
- Revista: Remote Sensing of Environment, Elsevier Science Publishing Company USA.
- Revista de Teledetección, Asociación Española de Teledetección, Madrid..