Course guides

13964 - ORSP - Optical Remote Sensing II: Passive

Unit in charge: Barcelona School of Telecommunications Engineering
Teaching unit: 739 - TSC - Department of Signal Theory and Communications.

Degree:
ERASMUS MUNDUS MASTER'S DEGREE IN RESEARCH ON INFORMATION AND COMMUNICATION TECHNOLOGIES (Syllabus 2009). (Optional subject).
MASTER'S DEGREE IN PHOTONICS (Syllabus 2009). (Optional subject).
ERASMUS MUNDUS MASTER'S DEGREE IN PHOTONICS ENGINEERING, NANOPHOTONICS AND BIOPHOTONICS (Syllabus 2010). (Optional subject).
MASTER'S DEGREE IN RESEARCH ON INFORMATION AND COMMUNICATION TECHNOLOGIES (Syllabus 2009). (Optional subject).

Academic year: 2015    ECTS Credits: 3.0    Languages: English

LECTURER

Coordinating lecturer:

Others:

PRIOR SKILLS


REQUIREMENTS


TEACHING METHODOLOGY

Classes in English. Oral-exposition classes combined with problem classes. Review of journal papers or others.

LEARNING OBJECTIVES OF THE SUBJECT

The aim of this course is to focus on the main systems, techniques and applications in remote sensing using passive optical sensors. The course reviews the fundamentals of radiometry from an unified point of view starting from Planck's Law to the radiative transfer equation. The expressions used in the optical, infrared and microwave parts of the spectrum are then presented as particular cases of this general formulation. Then, the course introduces basic concepts on passive remote sensing so as to pave the way to present the sensors and electronic imagery involved as well as application examples/missions relying on passive remote sensing. The parallelism between the optical/infrared and microwave sensors and the nomenclature is emphasized all along the course to show the common physical principles among them.

CONTENTS

1. Passive Remote Sensing: From Planck's law to the radiative transfer equation

Full-or-part-time: 2h
Theory classes: 2h
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<th>Full-or-part-time</th>
<th>Theory classes</th>
<th>Practical classes</th>
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<td>2. Passive Remote Sensing: Simplifications used in the different parts of the spectrum</td>
<td>2h</td>
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<td>4. Passive Remote Sensing: BRDF, interactions with the atmosphere and Earth's surface</td>
<td>2h</td>
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<td>5. Sensors and electronic imagery: Types of scanning</td>
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<td>6. Sensors and electronic imagery: Thermal detectors</td>
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<td>7. Sensors and electronic imagery: Radiometers and relevant parameters</td>
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<td>8. Sensors and electronic imagery: Multispectral, Thermal, and Hyperspectral passive remote sensing</td>
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<td>9. Applications: Target fields</td>
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10. Applications: Atmospheric observation
Full-or-part-time: 2h
Theory classes: 2h

11. Applications: Land and meteorological observation satellites
Full-or-part-time: 2h
Theory classes: 2h

12. Applications: Earth Observing Systems
Full-or-part-time: 2h
Theory classes: 1h
Practical classes: 1h

13. Exam
Full-or-part-time: 2h
Theory classes: 2h

GRADING SYSTEM
75 % final exam (multiple-answer test), 25 % Guided research work (can be computer based).

EXAMINATION RULES.
A minimum attendance of 80% is required. Exam duration: 2h. Guided research work: Oral exposition or interview (depending on the number of students).