Course guide
230323 - IPER - Pigment Identification with Raman Spectroscopy

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

Degree:
BACHELOR'S DEGREE IN TELECOMMUNICATIONS TECHNOLOGIES AND SERVICES ENGINEERING (Syllabus 2015). (Optional subject).
BACHELOR'S DEGREE IN ELECTRONIC ENGINEERING AND TELECOMMUNICATION (Syllabus 2018). (Optional subject).

Academic year: 2023  ECTS Credits: 2.0  Languages: Spanish

LECTURER
Coordinating lecturer: Consultar aquí / See here: https://telecos.upc.edu/ca/estudis/curs-actual/professorat-responsables-coordinadors/responsables-assignatura
Others: Consultar aquí / See here: https://telecos.upc.edu/ca/estudis/curs-actual/professorat-responsables-coordinadors/professorat-assignat-idioma

PRIOR SKILLS
Basic knowledge in Mathematics and Physics

TEACHING METHODOLOGY
Class room (16h) and laboratory (4h)

LEARNING OBJECTIVES OF THE SUBJECT
Experimentation of the new optical communications technologies applied to the pigment analysis

STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Hours large group</td>
<td>12,0</td>
<td>24.00</td>
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<tr>
<td>Self study</td>
<td>30,0</td>
<td>60.00</td>
</tr>
<tr>
<td>Hours small group</td>
<td>8,0</td>
<td>16.00</td>
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Total learning time: 50 h
CONTENTS

Pigment identification with Raman spectroscopy: Application of the laser to the investigation and conservation of artworks

Description:
- Scientifical methodologies in conservation, restoration, datation and catalogation of artworks
- Pulsed lasers (IR and UV) in the conservation of the cultural heritage (laser cleaning)
- CW laser and Raman spectroscopy: molecular information (the Raman effect)
- Modern systems of Raman spectroscopy with optical fiber: direct and non destructive identification of pigments
- Fundamental parameters in Raman analysis
- Noise and interferences in a Raman spectrum: SNR optimization
- Differentiation between natural and synthetic pigments
- Spectral identification in mixtures of pigments
- Experiences with the Cultural Heritage at the UPC
- Evaluation

Related activities:
Raman in Art Laboratory

Full-or-part-time: 20h
Laboratory classes: 12h
Guided activities: 8h

GRADING SYSTEM

Class attendance (60%) and delivery of a proposed work (40%)