Course guides
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 AUDIOVISUAL SYSTEMS ENGINEERING (Syllabus 2009). (Optional subject).
- BACHELOR'S DEGREE IN ELECTRONIC SYSTEMS ENGINEERING (Syllabus 2009). (Optional subject).
- BACHELOR'S DEGREE IN NETWORK ENGINEERING (Syllabus 2010). (Optional subject).
- BACHELOR'S DEGREE IN TELECOMMUNICATIONS SCIENCE AND TECHNOLOGY (Syllabus 2010). (Optional subject).
- BACHELOR'S DEGREE IN TELECOMMUNICATIONS SYSTEMS ENGINEERING (Syllabus 2010). (Optional subject).
- 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: 2021  ECTS Credits: 2.0  Languages: Spanish

LECTURER
Coordinating lecturer: Sergio Ruiz Moreno
Others: Sergio Ruiz Moreno

PRIOR SKILLS
First course completed

TEACHING METHODOLOGY
Class room and laboratory

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>
</tr>
</thead>
<tbody>
<tr>
<td>Self study</td>
<td>30,0</td>
<td>60.00</td>
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<tr>
<td>Hours large group</td>
<td>12,0</td>
<td>24.00</td>
</tr>
<tr>
<td>Hours small group</td>
<td>8,0</td>
<td>16.00</td>
</tr>
</tbody>
</table>

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

Experimental tasks and continuous evaluation