Course guide
230327 - PSM - Music Signal Processing

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 DATA SCIENCE AND ENGINEERING (Syllabus 2017). (Optional subject).
Academic year: 2022  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 signal, systems and signal processing

REQUIREMENTS
INTRODUCTION TO AUDIOVISUAL SIGNAL PROCESSING - Prerequisite
SIGNALS AND SYSTEMS - Prerequisite

TEACHING METHODOLOGY
Lectures
Lab sessions
Individual work (distance)

LEARNING OBJECTIVES OF THE SUBJECT
This course provides an introduction to the modeling of musical signals, digital audio effects and sound synthesis. During the course, students will learn the basic notions allowing them to create or study an original synthesizer or digital audio effect.

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>
</tr>
<tr>
<td>Hours small group</td>
<td>20,0</td>
<td>40.00</td>
</tr>
</tbody>
</table>

Total learning time: 50 h
## CONTENTS

### title eMusical signal modeling

**Description:**
- Temporal notions (ADSR envelope)
- Spectral modeling: Sinusoidal, harmonic and stochastic models.

**Full-or-part-time:** 4h  
Laboratory classes: 4h

### Digital audio effect

**Description:**
- Delay  
- Amplitude and Ring modulation  
- Time stretching  
- Pitch correction  

**Full-or-part-time:** 5h  
Laboratory classes: 5h

### Sound synthesis

**Description:**
- Subtractive synthesis  
- FM synthesis  
- Physical modeling  
- Percussion synthesis and sequencers  

**Full-or-part-time:** 6h  
Laboratory classes: 6h

### Project

**Description:**
Creation or study of an original synthesizer or digital audio effect

**Full-or-part-time:** 5h  
Theory classes: 5h

## GRADING SYSTEM

Creation and evaluation of an original instrument or digital audio effect (50%). Work in group of two students (50%).

## BIBLIOGRAPHY

### Basic: