

EE-490(a)

**Lab in acoustics**

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<b>Cursus</b>	<b>Sem.</b>	<b>Type</b>
Electrical and Electronical Engineering	MA1, MA3	Opt.

Language of teaching	English
Credits	4
Withdrawal Session	Unauthorized Winter
Semester	Fall
Exam	During the semester

Workload	120h
Weeks	14
<b>Hours</b>	<b>4 weekly</b>
TP	4 weekly

**Number of positions**

**Il n'est pas autorisé de se retirer de cette matière après le délai d'inscription.**

**Summary**

Apply the knowledge acquired in Electroacoustics, Audio Engineering and Propagation of Acoustic Waves lectures.

**Content**

1. TP1: Matlab - programming of tools for acoustics and audio
2. TP2: Analysis and synthesis of a piano note
3. TP3: Audiometry
4. TP4: Auditory localization
5. TP5: Reverberant room
6. TP6: Absorption in impedance tube
7. TP7: Acoustic expertise
8. TP8: Simulation of spherical sound sources with COMSOL
9. TP9: Simulation 1D acoustic waveguide with COMSOL
10. TP10: Simulation of the impedance tube (TP6) with COMSOL
11. TP11: Assessment of Thiele & Small parameters for a loudspeaker
12. TP12: Coherent sources / interferences
13. TP13: Measurement of sources directivity

**Keywords**

Sound synthesis  
3D sound perception  
Room acoustics  
Acoustic absorption  
Loudspeakers  
Acoustic expertise

**Learning Prerequisites****Required courses**

Audio Engineering or Propagation of acoustic waves

**Recommended courses**

Electroacoustics

**Important concepts to start the course**

Acoustic waves  
 Transmission lines  
 Physical measurement  
 Characterization of physical systems, impulse response  
 Signal processing, Fourier analysis

**Learning Outcomes**

By the end of the course, the student must be able to:

- Argue hypothesis justifying a physical observation
- Formulate physical explanations
- Synthesize experimental results
- Organize the work within a team of students

**Transversal skills**

- Use a work methodology appropriate to the task.
- Give feedback (critique) in an appropriate fashion.
- Identify the different roles that are involved in well-functioning teams and assume different roles, including leadership roles.

**Teaching methods**

1 laboratory fiche given every week.  
 4 hours to perform the work described in the fiche  
 1 assistant providing help if required  
 Report the work within a 15 days deadline

**Expected student activities**

Report the work

**Assessment methods**

Report correction

**Supervision**

Office hours	Yes
Assistants	Yes
Forum	No

**Resources****Bibliography**

Mario Rossi, Audio, PPUR, 2007  
 Vincent Martin, Elements d'acoustique générale, PPUR 2007

**Ressources en bibliothèque**

- [Éléments d'acoustique générale / Martin](#)
- [Audio / Mario](#)