370548 - AUDIOLOG - Introduction to Audiology

Coordinating unit: 370 - FOOT - Terrassa School of Optics and Optometry
Teaching unit: 731 - OO - Department of Optics and Optometry
Academic year: 2019
Degree: BACHELOR'S DEGREE IN OPTICS AND OPTOMETRY (Syllabus 2009). (Teaching unit Optional)
ECTS credits: 3
Teaching languages: Catalan, English

Teaching staff
Coordinator: Cardona Torradeflot, Genis

Opening hours
Timetable: Ask for an appointment through genis.cardona@upc.edu

Prior skills
Basic knowledge of Physics and Physiology

Requirements
Basic knowledge of Physics and Physiology

Degree competences to which the subject contributes

Specific:
0. Applying the scientific basis needed for the development of the profession.
0.9. Being able to perform literature searches.
1.1.2. Knowing how to do clinical examinations and interpret the results
1.2.4. Communicate and inform the patient of all the tests to be performed and the results of clinical evaluation
2.2.6. Individualize treatment planning.
3a.0.4. Provide tracking service that best suits each patient.

General:
T1. Ethical and social commitment and sustainability.
T2. Effective communication (oral and written). (in Catalan, Spanish and English)
T2.1.2. Develop empathy with people

Teaching methodology
Lectures (large group), with guest experts if necessary, and practical lab sessions (small group)

Learning objectives of the subject
370548 - AUDIOLOG - Introduction to Audiology

Nature of sound and its parameters  
Ear anatomy and physiology  
Audiometric techniques  
Interpretation of audiometric graphs  
Hearing loss, causes and typology  
Hearing aids, types and selection  
Programming digital hearing aids  
Fitting hearing aids and follow-up

<table>
<thead>
<tr>
<th>Study load</th>
<th>Hours medium group:</th>
<th>Hours small group:</th>
<th>Self study:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total learning time:</strong> 75h</td>
<td>21h</td>
<td>9h</td>
<td>45h</td>
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<td>28.00%</td>
<td>12.00%</td>
<td>60.00%</td>
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### Sound: definition and properties

**Description:**
In this preliminary section, we will review the main characteristics of the waves, with particular attention to the sound waves, as different from light waves. We will describe the properties and phenomena related to sound.

**Related activities:**
Lab session 1. Use of apps to analyze frequency and amplitude of different sound sources.

**Specific objectives:**
- To know the characteristics of sound.
- To understand sound as a longitudinal wave requiring a medium of propagation.
- To know the basic properties of sound propagation (reflection, interference, doppler effect...).
- To know the dynamic range of human hearing (frequency and amplitude).

### Ear anatomy and physiology

**Description:**
In this section we will describe briefly the anatomy of the ear: external ear, middle ear and internal ear. Besides, we will describe how each part functions and the contribution towards the complete hearing process.

**Related activities:**
This section does not have any activities.

**Specific objectives:**
- To know the parts of the human ear.
- To understand how each of these parts leads to a complete sense of hearing.
- To follow a sound wave from the outside of the ear to its interpretation at the central nervous system.
### Audiometry

**Description:**
Description of the classical audiometric test, i.e., audiometry. Introduction to the audiometer and to the methodology related to air and bone audiometry, with or without masking. Approach to the threshold of pain as a supraliminal test. Interpretation of audiometric graphs.

**Related activities:**
- Lab session 2: Air and bone tone audiometry
- Lab session 3: Masking and supraliminal audiometry
- Task 1

**Specific objectives:**
- To know how to operate an audiometer.
- To gain proficiency to perform air and bone audiometries, with or without masking.
- To gain proficiency to perform supraliminal tests.
- To provide a correct interpretation to audiometries.

<table>
<thead>
<tr>
<th><strong>Learning time:</strong></th>
<th>15h</th>
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<tbody>
<tr>
<td>Theory classes:</td>
<td>3h</td>
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<tr>
<td>Laboratory classes:</td>
<td>4h</td>
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<tr>
<td>Self study:</td>
<td>8h</td>
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### Complementary audiometry tests

**Description:**
Description of several additional tests to better understand the hearing perception and discrimination of the patient (logoaudiometry), and to assess the health of the middle ear (impedance measurement), amongst others.

**Related activities:**
- Lab session 4: Logoaudiometry and other complementary tests

**Specific objectives:**
- To know the basis of logoaudiometry, and to be able to administer this test and correctly assess the results.
- To know the fundamentals of impedance measurement.
- To have a basic understanding of other objective tests commonly employed to diagnose hearing disorders.

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<thead>
<tr>
<th><strong>Learning time:</strong></th>
<th>10h</th>
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<tbody>
<tr>
<td>Theory classes:</td>
<td>3h</td>
</tr>
<tr>
<td>Laboratory classes:</td>
<td>3h</td>
</tr>
<tr>
<td>Self study:</td>
<td>4h</td>
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Hearing loss

Learning time: 12h
- Theory classes: 4h
- Self study: 8h

Description:
The various conditions leading to hearing loss will be described, highlighting age-related hearing loss, followed by the correct interpretation of the results provided by tonal audiometry and by other complementary tests. Classical syndromes (such as Ménière syndrome) will be described, as well as tinnitus.

Related activities:
Lab session 2: Air and bone tone audiometry
Lab session 3: Masking and supraliminal audiometry
Lab session 4: Logoaudiometry and other complementary tests

Specific objectives:
- To know the main ear pathologies leading to hearing loss.
- To know the presentation and symptoms of some of the syndromes with highest incidence which cause hearing loss (such as Ménière syndrome).
- To acquire the required skills to correctly interpret the results of audiograms and other complementary tests.
- To know the main etiology, characteristics and treatment of tinnitus.

Hearing aids

Learning time: 22h
- Theory classes: 5h
- Self study: 17h

Description:
Description of the different types of hearing aids, highlighting the benefits and pitfalls of each modality. Fitting a hearing aid, and posterior follow-up. Technology and programming of hearing aids. Selection of the available hearing aids according to type and severity of hearing loss.

Related activities:
Tasks 2 and 3

Specific objectives:
- To know the different types of hearing aids.
- To acquire a basic understanding of the technology and programming of hearing aids.
- To determine the best type of hearing aid for each patient according to hearing loss typology and severity.
- To know the different steps required to successfully fit a hearing aid and the posterior follow-up.

Qualification system

Final exam (50%)
Compulsory tasks to be conducted in group (30%)
Attendance and successful performance in lab sessions (20%)
Regulations for carrying out activities

The final exam will consist in multiple choice questions (4 responses, with penalization of the errors). The examen may contain questions related to the resolution of practical cases, interpretation of graphs, etc.

Bibliography

Basic:


Complementary: