

**Anatomy and Physiology of Speech and Vocal
Organs**

Code: 101701
ECTS Credits: 6

Degree	Type	Year	Semester
2500893 Speech therapy	FB	1	1

The proposed teaching and assessment methodology that appear in the guide may be subject to changes as a result of the restrictions to face-to-face class attendance imposed by the health authorities.

Contact

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Use of Languages

Principal working language: catalan (cat)
Some groups entirely in English: No
Some groups entirely in Catalan: Yes
Some groups entirely in Spanish: No

Teachers

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Prerequisites

There are no official pre-requisites

It is recommended that the student has previously acquired the basic knowledge about physics and cell and chemical biology

Objectives and Contextualisation

The subject "Anatomy and Physiology of the Voice and Speech Organs" is programmed during the first semester of the first course and develops the knowledge of the general characteristics of the structure and the function of the structures involved in the production of voice and speech: the respiratory system, vocal tract and the organs of phonatory process and the resonance. The objectives of the subject are to present in an integrated way the knowledge related to the body organs that allow the production of the voice and the speech in the human beings.

Therefore when finishing the course, the student will have to be able to identify and describe the normal function of the body organs that allow the production of the voice and the speech in the human beings.

Competences

- Analyse and synthesise information.
- Critically evaluate the techniques and instruments of evaluation and diagnosis in speech therapy, as well as its procedures of intervention.

- Demonstrate an understanding and correct use of the terminology and methodology of speech-therapy research.
- Find, evaluate, organise and maintain information systems.
- Have a strategic and flexible attitude to learning.
- Integrate the foundations of biology (anatomy and physiology), psychology (evolutionary processes and development), language and teaching as these relate to speech-therapy intervention in communication, language, speech, hearing, voice and non-verbal oral functions.
- Managing communication and information technologies.
- Master the terminology that facilitates effective interaction with other professionals.
- Present adequate speech production, language structure and voice quality.
- Understand, integrate and relate new knowledge deriving from autonomous learning.
- Understand, interpret and express orally and in writing, in a foreign language, contents within the ambit of health.
- Use the exploratory techniques and instruments pertaining to the profession, and register, synthesise and interpret the data provided by integrating this into an overall information set.
- Working in intra- and interdisciplinary teams.

Learning Outcomes

1. Analyse and synthesise.
2. Correctly interpret the results of an exploration of the nervous system and the organs of voice and speech.
3. Correctly use the nomenclature of cell biology, human anatomy and the main terms of physiology.
4. Demonstrate proper diction and proper syntactic structure and discourse in the public presentations of projects.
5. Describe the meaning of key terms relating to structural and functional, normal and pathological features.
6. Describe the usefulness of the main instruments in the physiological assessment of the nervous system and organs of voice and speech.
7. Have a strategic and flexible attitude to learning.
8. Identify and describe the anatomy of the nervous system and of the organs of voice and speech.
9. Identify and describe the physiology of the nervous system and of the organs of voice and speech, in addition to their molecular and cellular bases.
10. Managing communication and information technologies.
11. Perform a basic examination of voice and speech organs.
12. Search, evaluate, organise and maintain information systems.
13. Understand, integrate and relate new knowledge deriving from autonomous learning.
14. Understand, interpret and express orally and in writing, in a foreign language, contents within the ambit of health.
15. Working in intra- and interdisciplinary teams.

Content

General justification:

The degree of Speech Therapy is defined as a Health Degree, and therefore, in the basic courses, it is necessary to carry out the learning of the structure and function of those organs that will be responsible for the production of the voice and speech and the development of language. These basic lessons must provide to the student enough tools to face successful clinical and, in the longer term, to be able to carry out an effective and rigorous professional task, based on scientific knowledge.

The Speech therapist is a professional who works to prevent, detect, identify, evaluate, diagnose, and provide treatment and follow-up for people of all ages at risk of suffering from speech, voice, language, swallowing disorders and related disorders. In addition, "he /she teach, supervise, and guides research programs or activities related to related sciences. Therefore, he/she must use the scientific method to measure treatments, evaluate their effectiveness, modify them based on their assessment and disseminate the results ". All of this allows us to justify the importance of this subject for the professional future.

In other words, the speech therapist must know the structure and functioning of the respiratory system, as well as the vocal tract and the organs of the phonatory process and resonance, in order to understand, diagnose, treat, prevent and investigate the alterations that affect voice, speech and language. The program of this subject is oriented precisely to the achievement of these objectives.

GENERAL CONCEPTS

General organization of the human body

- Anatomy concept
- Levels of organization of the human body
- Anatomical position
- Levels and sections of the human body
- Generalities of the musculoskeletal, nervous and vascular systems

Functional organization of the organs related to the voice and the speech

- Respiratory system: Airstream producer
- Larynx: vocal folds oscillation and voice generation
- Vocal tract: Speech resonance
- Articulation: generating speech
- Speech process

LANGUAGE ORGANS

1. RESPIRATORY SYSTEM

Anatomy of the respiratory system

- Division and parts of the respiratory system
- Respiratory tracts and lungs
- Chest bones
- Muscles associated with breathing
- Innervation and vascularization

Physiology of the respiratory system

- Organization and functional characteristics of the respiratory system
- Respiratory functions and non-respiratory functions of the respiratory system
- Physiology of the pleural system
- Ventilatory mechanics
- Elasticity and resistance of the respiratory system. Respiratory work
- Measurement of the ventilatory function: spirometry and elimination of inert gas
- Volumes and lung capacity

- Alveolar ventilation and respiratory dead areas
- Pulmonary ventilation during speech
- Functional organization of the ventilation system control
- Respiratory rhythm: origin and conditioning factors
- Nervous and humoral regulation of ventilation

2. PHONATORY SYSTEM

Anatomy of phonatory system

- General characteristics of the larynx
- Cavity: division, mucosa and spaces
- Cartilage of the larynx
- Membranes and ligaments of the larynx
- Muscular larynx
- Innervation and vascularization
- Biomechanics of the larynx

Physiology of the larynx

- Methods of study of the larynx behaviour
- Physiology of the vibration of the vocal folds: myoelastic and aerodynamic theory
- Phases of the phonation: start, endurance and ending
- Functional characteristics of the oscillation cycle of vocal folds
- Frequency, intensity and timbre of voice. Implication of laryngeal muscles
- Environmental factors that affect the voice
- Voice changes with age
- Voice records
- Nerve control of the larynx

3. ARTICULATION AND VOICE RESSONANCE

Anatomy of organs of articulation and resonance

- Location and general structure of the vocal tract
- Skull and face bones
- Skull and face articulation
- Skull and face musculature
- Structure of the nose: nasal pyramid, fossae and paranasal sinuses
- Structure of the mouth: parts, glands, lips, gums and teeth, palate, tongue

- Structure of the pharynx: division, muscles and innervation

Physiology of vocal tract and articulation. Speech

- Functional organization
- Resonance in the vocal tract: frequency of resonance and formants
- Resonance changes with pharyngeal and velopharyngeal movements
- Factors that influence the resonance
- Resonance changes with age
- Function of the articulators in the production of speech
- Role of the salivary glands in the articulation of speech
- Nervous control of the articulators and resonators
- Functional bases of the production and perception of speech

Methodology

Theory classes:

Systemized explanation of the subject topics, giving relevance to the most important concepts. The student acquires the basic scientific knowledge of the subject attending to theory classes, which will complement by self-study of the topics of the subject program. At the classes will combine the face-to-face and on-line formats

Case Seminars:

Presentation of clinical cases related to the subject with learning objectives on which students must work individually or in groups, also in small groups, with personal study.

Laboratory classes:

Practical sessions for the observation of anatomical structures and the practical learning of physiological techniques. Group work and active self-learning are promoted.

Preparation of a written review:

Based on a set of topics proposed for the subject, students must meet in groups of no more than four people, and prepare a revision work that will be evaluated by the teaching team of the subject. The revision work will be presented to the rest of the main class group.

N.B. The proposed teaching and assessment methodologies may experience some modifications as a result of the restrictions on face-to-face learning imposed by the health authorities. The teaching staff will use the Moodle classroom or the usual communication channel to specify whether the different directed and assessment activities are to be carried out on site or online, as instructed by the Faculty".

Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			

Cases seminars and written review	10	0.4	12, 14, 2, 15, 3, 10
Laboratory classes	10	0.4	11, 15, 3
Theory classes	33	1.32	3
Type: Supervised			
Tutorial teaching, attended and virtual	6	0.24	12, 3
Type: Autonomous			
Preparation of cases seminars	12.5	0.5	15, 3
Preparation of laboratory classes	13	0.52	11, 3, 10
Preparation of written review	16	0.64	1, 12, 13, 14, 15, 3, 10
Self-study	42	1.68	12, 3

Assessment

- The competences of this subject will be evaluated through objective tests, portfolio and case solutions, and presentation of written review with the mechanisms detailed in the table of learning outcomes.
- In order to pass the subject, it is necessary to obtain equal to or greater than 5.0, as an average of the set of EVs, provided that 5.0 or higher has been obtained from EV1 and EV3.
- Students who have not passed the subject but have a course mark of 3.5 or more points, they can take up an EV1 and / or Ev3 Evidence Recovery test. In case anyone have not been passed, and have been previously evaluated in a series of activities whose weight equals to a minimum of 2/3 parts of the total grade of the subject.
- A student who has provided learning outcomes with a weight less than 4 points (40%) will be considered as "non-evaluable".
- Second registration students may be exempt from participating in the practical activities if they have passed the EV5 and EV6 of the previous year. In this case, the note (obtained by the EV5 and EV6) will be kept even if they will have the right to renounce it in writing and to re-submit from the beginning of the course. It is not foreseen to substitute the appraisal for a work of synthesis

<https://www.uab.cat/web/estudiar/graus/graus/avaluacions-1345722525858.htm>

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
1) 1st Objective multiple-choice test (theory and practices)	30% (theory) + 10% (practice)	2	0.08	5, 6, 11, 9, 8, 3
2) 2nd Objective multiple-choice test (theory and practices)	30% (theory) + 10% (practice)	2	0.08	5, 6, 11, 9, 8, 3
3) Continuous evaluation of practices	10%	1.5	0.06	6, 11, 7, 15, 3
4) Preparation of Seminar cases and written review	10%	2	0.08	1, 12, 13, 14, 5, 6, 2, 4, 7, 15, 3, 10

Bibliography

1.- Fundamental bibliography

Francois Le Huche, Andre Allali. Anatomia y Fisiologia de los órganos de la voz y del habla - Vol. 1. Elsevier-Masson, Barcelona. 2004

David H McFarland. Atlas de Anatomia en Ortofonía. Elsevier-Masson, Barcelona. 2008

Jordi Peña Casanova. Manual de Logopedia. Editorial Elsevier. 4a Ed. Barcelona. 2013

Anthony Seikel, David G. Drumright, et ál Anatomy and Physiology for Speech, Language, and Hearing . |6th edition. 2019

Rodríguez S, Smith-Agreda JM. Anatomia de los órganos del lenguaje, visión y audición. Panamericana, Madrid. 2003

Begoña Torres Gallardo. La veu i el nostre cos. Anatomia funcional dela veu. EditorialHorsori. 1a Ed. Barcelona. 2014

Begoña Torres, Ferran Gimeno. Bases anatòmiques de la veu. Proa-Biblioteca Universitària, Barcelona. 1995

2.-Bibliography would complement

Bustos Sánchez,Benoit Amy de la Bretèque, Diana Grandi, Cori Casanova, Salvador Casadevall, Ana Lou,Andreu Sauca, Queralt Botey, Ferran Ferran, Marta Jordana, Gemma Solà, Pepi Martín, Núria Rebull, Hellen Rowson, Ricard Monge. Intervención logopédica en transtornos de la voz. Editorial Paidotribo. Barcelona. 2013

Coll-Florit Marta, Gerardo Aguado, Alicia Fernández-Zúñiga, Sara Gamba, Enrique Perelló, Josep Maria Vila-Rovira. Transtornos del habla y de la voz. Editorial UOC. Barcelona. 2013

Richard L Drake, Wayne Vogl, Adam WM Mitchell. Anatomía de Gray para estudiantes. 2a edició (o posteriors) Elsevier, Barcelona, 2010

Nielsen M, Miller S. Atlas de Anatomía humana. Panamericana, Madrid 2011

Gerard J Tortora, Bryan Derrickson. Introducción al cuerpo humano: fundamentos de anatomía y fisiología. Panamericana, 2008.