Universitat Autònoma de Barcelona

2023/2024

Anatomy and Physiology of Speech and Vocal Organs

Code: 101701
ECTS Credits: 6

Degree	Type	Year	Semester
2500893 Speech therapy	FB	1	1

Contact

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Teaching groups languages

You can check it through this link. To consult the language you will need to enter the CODE of the subject. Please note that this information is provisional until 30 November 2023.

Teachers

Guillermo Garcia Alias

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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

- Act with ethical responsibility and respect for fundamental rights and duties, diversity and democratic values.
- 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.
- Innovate in the methods and processes of this area of knowledge in response to the needs and wishes of society.
- 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.
- Students can apply the knowledge to their own work or vocation in a professional manner and have the powers generally demonstrated by preparing and defending arguments and solving problems within their area of study.
- Students must be capable of collecting and interpreting relevant data (usually within their area of study) in order to make statements that reflect social, scientific or ethical relevant issues.
- Students must be capable of communicating information, ideas, problems and solutions to both specialised and non-specialised audiences.
- Students must develop the necessary learning skills in order to undertake further training with a high degree of autonomy.
- Students must have and understand knowledge of an area of study built on the basis of general secondary education, and while it relies on some advanced textbooks it also includes some aspects coming from the forefront of its field of study.
- 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 a situation and identify points for improvement.
2. Analyse and synthesise.
3. Correctly interpret the results of an exploration of the nervous system and the organs of voice and speech.
4. Correctly use the nomenclature of cell biology, human anatomy and the main terms of physiology.
5. Critically analyse the principles, values and procedures that govern the exercise of the profession.
6. Demonstrate proper diction and proper syntactic structure and discourse in the public presentations of projects.
7. Describe the meaning of key terms relating to structural and functional, normal and pathological features.
8. Describe the usefulness of the main instruments in the physiological assessment of the nervous system and organs of voice and speech.
9. Explain the explicit or implicit code of practice of one's own area of knowledge.
10. Have a strategic and flexible attitude to learning.
11. Identify and describe the anatomy of the nervous system and of the organs of voice and speech.
12. Identify and describe the physiology of the nervous system and and of the organs of voice and speech, in addition to their molecular and cellular bases.
13. Identify situations in which a change or improvement is needed.
14. Managing communication and information technologies.

15. Perform a basic examination of voice and speech organs.
16. Search, evaluate, organise and maintain information systems.
17. Students can apply the knowledge to their own work or vocation in a professional manner and have the powers generally demonstrated by preparing and defending arguments and solving problems within their area of study.
18. Students must be capable of collecting and interpreting relevant data (usually within their area of study) in order to make statements that reflect social, scientific or ethical relevant issues.
19. Students must be capable of communicating information, ideas, problems and solutions to both specialised and non-specialised audiences.
20. Students must develop the necessary learning skills in order to undertake further training with a high degree of autonomy.
21. Students must have and understand knowledge of an area of study built on the basis of general secondary education, and while it relies on some advanced textbooks it also includes some aspects coming from the forefront of its field of study.
22. Understand, integrate and relate new knowledge deriving from autonomous learning.
23. Understand, interpret and express orally and in writing, in a foreign language, contents within the ambit of health.
24. 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

- Physiologyof 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.

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".

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Cases seminars and written review	10	0.4	5, 1, 16, 23, 9, 13, 3, 21, 20, 19, 17, 18, 24, 4, 14
Laboratory classes	10	0.4	15, 24, 4
Theory classes	33	1.32	4
Type: Supervised			
Tutorial teaching, attended and virtual	6	0.24	16, 4
Type: Autonomous			
Preparation of cases seminars	12.5	0.5	5, 9, 17, 18, 24, 4

Preparation of laboratory classes	13	0.52	5, 15, 17, 18, 4, 14
Preparation of written review	16	0.64	5, 2, 1, 16, 22, 23, 13, 20, 19, 17, 18, 24, 4, 14
Self-study	42	1.68	5, 16, 17, 18, 4

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 (having a final grade of less than 5 and/or not having EV1 and EV3 with a grade of 5 or more points) may take a make-up test the evidence EV1 and/or EV3, provided that it has been previously evaluated in a set of activities whose weight is equivalent to a minimum of 2/3 parts of the total qualification of the subject or module.

- A student who has provided learning outcomes with a weight less than 4 points (40%) will be considered as "non-evaluable".

- Second or superior 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 synthesis exam.

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

Single evaluation

Students can take advantage of the single evaluation system, according to the regulations of the Faculty. It is essential to request this option within the period established by the faculty. The single assessment will be based on the same content of the course program, the acquisition of the same skills, and will have the same level of demand as the continuous assessment. Those students who take advantage of the single evaluation will take EV 1, EV2, EV3 and EV4 on the same day that EV3 is carried out (second evaluation period). That same day they will deliver the EV5 and EV6.

For the evaluation of each block, an exam consisting of multiple choice questions and/or restricted written questions will be carried out to evaluate the theoretical knowledge of the subject (EV1 and EV3) and the concepts related to laboratory practices and case studies. (EV2 and EV4), each one with an approximate weighting of 30% and 10%, respectively, of the overall grade for each system. To pass the subject, a score equal to or greater than 5 must be obtained in the weighted average of the scores. Evidences not delivered have a score of 0 (zero) and those delivered are considered approved if they have a grade equal to or greater than 5. The subject is considered passed as described by the continuous assessment and the same system will be followed. of recovery than that of the single evaluation. If the student does not pass these tests, they may choose to recover them in the recovery period, under the same conditions as students who follow the continuous assessment (see Recovery section).

Link to the faculty evaluation guidelines:
https://www.uab.cat/web/estudiar/graus/graus/avaluacions-1345722525858.html

The review of grades will follow the same procedure as for continuous assessment.

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
1) EV 1 and 2 - 1st Objective multiple-choice test (theory and practices)	30% (theory) + 10% (practice)	2	0.08	7, 8, 15, 12, 11, 21, 17, 18, 4
2) EV 3 and 4 - 2nd Objective multiple-choice test (theory and practices)	30% (theory) + 10% (practice)	2	0.08	7, 8, 15, 12, 11, 21, 17, 18, 4
3) EV 5 - Continuous evaluation of practices	10%	1.5	0.06	5, 1, 8, 9, 15, 13, 21, 20, 17, 18, 10, 24, 4
4)EV 6 - Preparation of Seminar cases and written review	10%	2	0.08	5, 2, 1, 16, 22, 23, 7, 8, 9, 13, 3, 6, 21, 20, 19, 17, 18, 10, 24, 4, 14

Bibliography

1.- Fundamental bibliography

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Software

No specific software is needed