- Understand the concepts of phonetics and phonology
- Identify the relationship between phonetics and phonology
- Learn some basic phonetic patterns and rules that govern the occurrence of some specific sound realizations in English.

Introduction:

Each individual speaker pronounces one speech sound in different ways and in different words and situations. By way of example, a native speaker of English may pronounce the sound / **k** / with a puff of air in words like *kit* and *cake*. In words like *stuck* and *duck*, however, the same speaker would pronounce the sound / **k** / without a release of airflow. Such difference and many other cases are not arbitrary, as many non-linguists believe, but rule-governed and constrained by internal factors. Whenever the sound / **k** / occurs at the beginning of the word and is followed by a vowel, it is produced with a puff of air (**aspirated**). The same sound is said to be **unaspirated** if it occurs at the end of the word. The same rule can be applied to other sounds, like / **p** / and / **t** /, to name but a few. In fact, the distinction between how a sound is made and how it is pronounced in specific phonetic contexts corresponds significantly with the relationship between **Phonetics** and **Phonology**. The former is essentially concerned with the various ways in which human beings utter speech sounds and how the three systems, respiratory, phonatory and articulatory, operate to produce voices and sounds. Conversely, the latter, Yule (2020) notes, "is about the underlying design, the blueprint of each sound type, which may vary in different physical contexts" (p. 45).

The epigraph stated above (Pike, 1947) nicely echoes the relationship between the two fields. While it is possible for every student to learn phonetics as an independent field along with its basics, it is quite impossible for him/her to understand phonology without having a solid background knowledge in phonetics. Phonetics inputs to the field of phonology which needs a lot of phonetic information to account for all the potential sound patterns and their surrounding contexts. In brief, phonology is dependent on phonetics. A specialist in phonetics would ask: how do we produce sounds? whilst a phonologist would ask: which phonological factors influence the pronunciation of a single sound in different sound contexts.

SPEECH MECHANISMS

Lesson 7: Anatomy, Physiology and Speech Mechanisms

INSTRUCTIONAL OBJECTIVES

After studying this course, students will be able to:

- Understand the basics of speech mechanisms
- Learn the three processes involved in speech productions, namely respiration, phonation and articulation
- Understand the airstream types involved in speech production
- Learn about the speech organs that play a major role in the articulation of sounds

Introduction:

That speech production is one of the most complex physiological processes in the human body is crystal clear. A quick glance over the anatomy of speech reveals that the functions of some organs are manifold. By way of example, the teeth and tongue are intended for articulating sounds, on the one hand, and for chewing up and pushing food inwardly to the stomach, on the other. The lungs, by the same token, take part not only in speech production, but also in normal breathing. The larynx has protective and phonatory functions. In brief, organs play two basic roles-biological and in speech production. Since this course is mainly concerned with the phonetic side, we set the task to discuss the second function, speech, and foreground the anatomy and physiology of speech production. It is worth noting that the speech production involves three basic processes called **Respiratory System, Phonatory System** and **Articulatory System.**

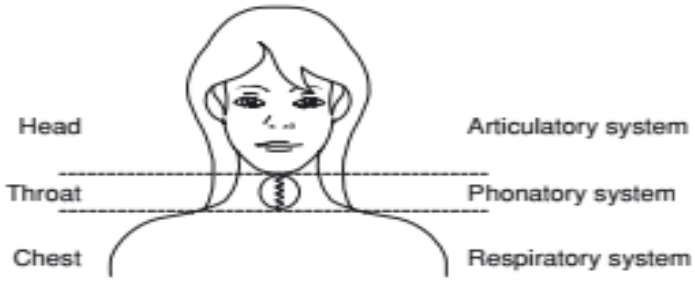

Figure 1. Basic Processes of Speech Production. From *Practical Phonetics and Phonology* (p. 30), by Collins, B. & Mees., I. M. (2003). London: Routledge.

Respiratory System:

The respiratory system is located in the chest. It is usually noted that lungs' main biological function is respiration, that is, breathing in and breathing out. However, the lungs, also, play a significant function in speech production. In fact, it is almost impossible to utter one single sound without the inhalation and exhalation of the airstream. The type of the airstream pushed out from your lungs is termed **Egressive Pulmonic airstream (see Figure 2 below).**

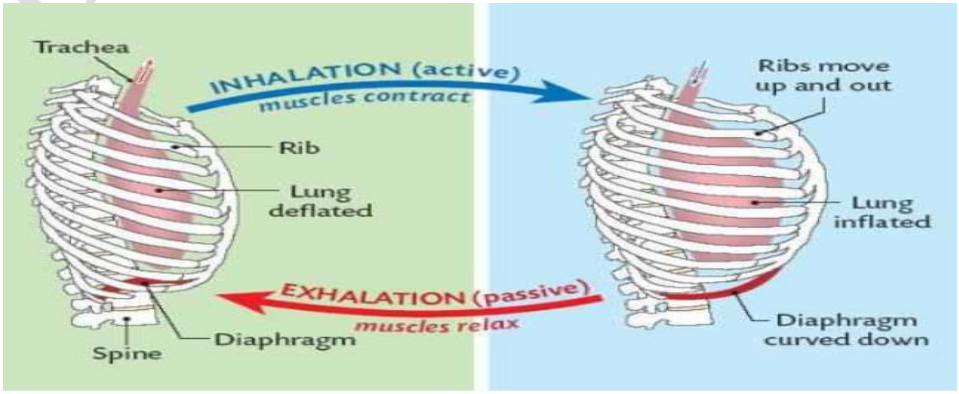

Figure 2. Egressive Pulmonic Airstream. From *Airstream Mechanisms and Phonation Types.*

The word **Egressive** means outward and **Pulmonic** is a Latin word and it refers to the *lung*. **Egressive Pulmonic airstream** is almost the opposite of the so called **Ingressive Pulmonic airstream,** which involves pushing the airstream inwardly, that is, towards the lungs (Collins & Mees, 2013). Although this type of airstream does not take part in the production of English sounds and many other world languages, it is usually used, intentionally and unintentionally, in some situations, such as when you sob or continuously count numbers. It also occurs when you express surprise such as when you unintentionally push the air inwardly as you hear surprising news or suddenly notice something scary or unusual.

Phonatory System:

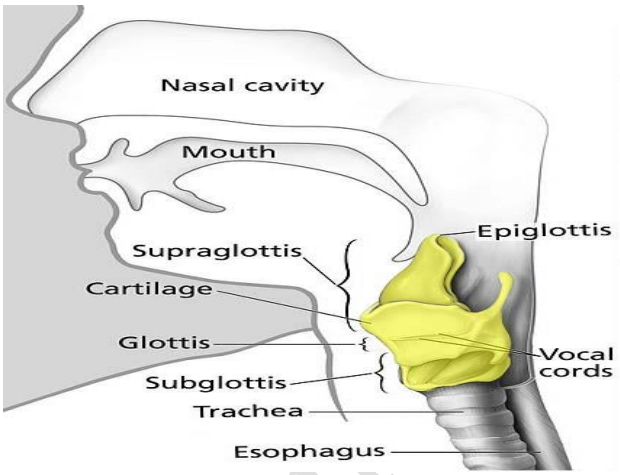

Figure 3. ***The Larynx*****. From** (https://teachmeanatomy.info/neck/viscera/larynx/organ/)

The Phonatory system is located in the throat. It is represented by the larynx (commonly called Adam's Apple), a voice-box device that produces different voices by modifying the shapes and tension of the vocal cords. The **abduction** and **adduction** processes, caused by the space between the vocal cords, are accompanied by the movement of the Egressive Pulmonic air stream inside the larynx. The airstream, then, moves through the pharynx and takes two directions, commonly known as **The Oral Cavity** (mouth) and **Nasal Cavity** (nose)

Articulatory System:

The normal way for any speech sound, be it a vowel or a consonant, to be produced is for speech organs to be combined and stricture be modified in different ways. The Articulatory system is located in the head and is usually termed the **Supra-Glottal Vocal Tract** by some phoneticians (Collins & Mees, 2013). Its anatomy consists of a set of speech organs located above the throat. The speech organs, which are movable, are labeled Active articulators, whilst those which are fixed are termed Passive Articulators.

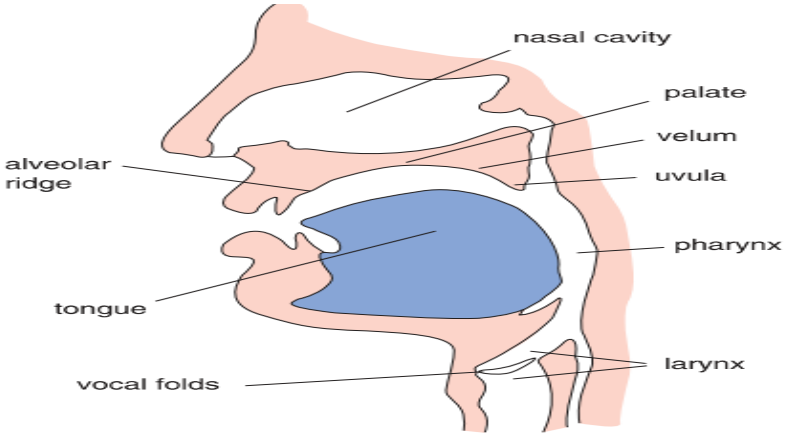

Figure 4. The Articulatory System. From *The Study of Language* (p. 30) .by Yule, G. (2020). Cambridge: Cambridge University Press.

A closer look at the vocal apparatus in figure 4, it appears that many organs interact with each other to produce meaningful speech sounds. For instance, in producing the consonant /**m**/ and /**b**/, one can easily notice the lower lip, fixed in the lower jaw, moving upwardly to form a firm closure with the upper lip. After the two lips are tightly hold together for a few milliseconds, they move apart from each other. The obstruction is, then, followed by a quick release of the airstream outside the mouth. The production of the semi-vowel /**w**/ involves a narrowness of the speech organs at two levels, mainly the lips and between the velum and the back part of the tongue.

PHONATION

Lesson 8: Phonatory System

INSTRUCTIONAL OBJECTIVES

After studying this course, students will be able to:

- Understand the basic mechanisms of the Phonatory system
- Identify the structure of the larynx and its essential functions

Introduction:

Phoneticians concur that speech vocal sounds are made by modifying the airflow at various *points* and in various *ways* in the whole articulatory system (Carr, 2013). One of those points is the **Larynx**, or the *voice box*, as it usually called by laypeople. This course considers the meaning of Phonatory system and casts light over the anatomy of the larynx and its basic functions (see Figure 5 below)