**Course plan**

**Respiratory physiology for PhD students**

Dr.aboutaleb

Number of hours: 34 hours

**The main objective of the course:**

Getting to know:

-Function and Structure of the Respiratory System

-Mechanics of Breathing

- Alveolar Ventilation

- Blood Flow to the Lung

- Ventilation-Perfusion Relationships

- Diffusion of Gases and Interpretation

- Transport of Oxygen and Carbon Dioxide in the Blood

- Control of Breathing

-Non respiratory Functions of the Lung

**Specific objectives**

Empowering students to describe and interpret:

Functions of the Respiratory System

Structure of the Respiratory System

Generation of a Pressure Difference Between Atmosphere and Alveoli

Pressure-Volume Relationships in the Respiratory System

Interaction of Lung and Chest Wall: The Static Pressure-Volume Curve

Airways Resistance

The Work of Breathing

The Lung Volumes

Measurement of the Lung Volumes

Anatomic Dead Space and Alveolar Ventilation

Measurement of Alveolar Ventilation

Alveolar Ventilation and Alveolar Oxygen and Carbon Dioxide levels

Regional Distribution of Alveolar Ventilation

The Closing Volume

The Effects of Aging

The Bronchial Circulation

The Functional Anatomy of the Pulmonary Circulation

Pulmonary Vascular Resistance

The Regional Distribution of Pulmonary Blood Flow:

The Zones of the Lung

Hypoxic Pulmonary Vasoconstriction

Effects of Mechanical Ventilation on Pulmonary Blood Flow

Pulmonary Edema

The Concept of Matching Ventilation and Perfusion

Consequences of High and Low V/Q

Testing for Nonuniform Distribution of lnspired Gas and Pulmonary Blood Flow

Regional V/Q Differences and Their Consequences in the Lung

of Pulmonary Function Tests

Fick's Law for Diffusion

Limitations of Gas Transfer

Diffusion of Oxygen

Diffusion of Carbon Dioxide

Measurement of Diffusing Capacity

Interpretation of Pulmonary Function Tests

Transport of Oxygen by the Blood

Dissociation Curve

Influences on the Oxyhemoglobin Dissociation Curve

Transport of Carbon Dioxide by the Blood

The Carbon Dioxide Dissociation Curve

The Bohr and Haldane Effects Explained

The Generation of Spontaneous Rhythmicity

The Medullary Respiratory Center

The Pontine Respiratory Groups

Spinal Pathways

Reflex Mechanisms of Respiratory Control

Influences of Higher Centers

The Response to Carbon Dioxide

The Response to Hydrogen Ions

The Response to Hypoxia

The Response to Exercise

Pulmonary Defense Mechanisms

Non respiratory Functions of the Pulmonary Circulation

Metabolic Functions of the Lung

The Respiratory System Under Stress

Exercise and the Respiratory System

Altitude and Acclimatization

Diving and the Respiratory System

Sleep and the Respiratory System

**Teaching methods**

Lecture

question and answer

PBL

**Student tasks**

Must present some of the content

Must explain some of the class content

**Type of test**

Descriptive exam

**Suggested resources for study:**

Pulmonary physiology Michael G. Levitzky

Respiratory physiology John B. West

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