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**COMMON COURSE NUMBER:** RET 2414

**COURSE TITLE:** Pulmonary Function

**CREDIT HOURS:** 3

**CONTACT HOUR BREAKDOWN:**

Lecture/Discussion: 48

Laboratory: 0

Other 00

**CONTACT HOURS/WEEK:** 3

**CATALOG COURSE DESCRIPTION:**

Refined techniques used for spirometry, gas analysis and theory of arterial blood gas analysis and the basic principles of cardiopulmonary stress testing are discussed. Mass screening and other techniques used in the diagnosis of cardiopulmonary disease are reviewed.

Prerequisites: RET 1485

Co requisites: RET 2414L

General Education Requirements - Associate of Arts Degree, meets Area(s): none

General Education Requirements - Associate in Science Degree, meets Area(s): none

**UNIT TITLES:**

1. Lung volumes and capacities
2. Flow measurement techniques
3. Blood gas sampling and measurement techniques
4. Cardiopulmonary stress testing

**I. Course Overview:**

Upon successful completion of this course, the students should be able to perform basic pulmonary function studies and correctly interpret the results of the studies

**II. Units:**

**Unit 1. Lung Values and Capacities**

General Outcome:

- 1.0 The student will identify the methods used to measure and evaluate lung size.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

- 1.1 List the four lung volumes and capacities.
- 1.2 List the normal values for each of the lung volumes and capacities.
- 1.3 Describe the relationship each of the volumes and capacities has to each other.
- 1.4 Identify the clinical significance associated with abnormalities in the lung volumes and capacities.
- 1.5 Calculate all lung volumes when given the values for the capacities.
- 1.6 Calculate all lung capacities when given the values for the volumes.
- 1.7 Describe the methods used to determine all lung volumes and capacities.
- 1.8 Identify the following and make conversions from one system to another.

BTPS ATPS ATPD STPD

## Unit 2. Flow Measurement Techniques

### General Outcome:

- 2.0 The students will identify the methods used to measure and evaluate airway resistance.

### Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

- 2.1 Describe the methods used to perform, FVC, MVV, PEFr and flow volume loop studies.
- 2.2 Calculate FEV<sub>1</sub>, FEV<sub>2</sub>, FEV<sub>3</sub>, FEF 25% - 75% and FEF 200 — 1200, when given the results of a FVC study.
- 2.3 Calculate the percentage of the FVC represented by the FEV<sub>1</sub>, FEV<sub>2</sub> and FEV<sub>3</sub> when given the results of a FVC maneuver.
- 2.4 Calculate PEFr, PIFr, FEF 25, FEF 50, FEF 75, FVC, FEV<sub>1</sub> and FEV<sub>1</sub>/FVC when given the results of a flow volume loop study.
- 2.5 Analyze and interpret the results of all of the flow studies listed above.

## **Unit 3. Blood Gas Sampling and Measurement Techniques**

### General Outcome:

- 3.0 The students will describe the techniques used to sample and measure gases in the atmosphere, exhaled air and blood.

### Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

- 3.1 Identify the sites used to obtain arterial blood samples.
- 3.2 Describe the advantages for each arterial blood sampling site.
- 3.3 List the electrodes used to measure PO<sub>2</sub>, PCO<sub>2</sub> and pH.
- 3.4 Describe the principle of operation each blood gas electrode uses.
- 3.5 Describe the technique used by oximeters and ETCO<sub>2</sub> monitors in measuring exhaled CO<sub>2</sub>, carbon monoxide and hemoglobin oxygen saturation.
- 3.6 Describe the calibration points and techniques used with pH, PCO<sub>2</sub> and PO<sub>2</sub> electrodes.
- 3.7 Calculate the calibration points for oxygen and carbon dioxide analysis when given barometric pressure and gas concentration.

## **Unit 4. Stress Testing Procedures**

### General Outcome:

- 4.0 The students will describe the techniques used to perform cardiopulmonary stress studies and interpret the results of ventilatory and cardiac profiles.

### Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

- 4.1 Describe the cardiopulmonary stress testing protocols for Bruce, Balke and ramping techniques.
- 4.2 Evaluate the ventilatory profile obtained from a stress test including  $VO_2$ ,  $VCO_2$ , RER, VE, respiratory rate, tidal volume,  $Vd/Vt$ ,  $O_2$  pulse and anaerobic threshold.
- 4.3 Evaluate a 12 lead EKG tracing obtained from a cardiopulmonary stress test with special attention to arrhythmias and S-T segment changes.