

# RSPT 306: ADVANCED PULMONARY DIAGNOSTICS

## Foothill College Course Outline of Record

Heading	Value
Effective Term:	Summer 2024
Units:	5
Hours:	5 lecture per week (60 total per quarter)
Degree & Credit Status:	Degree-Applicable Credit Course
Foothill GE:	Non-GE
Transferable:	CSU
Grade Type:	Letter Grade Only
Repeatability:	Not Repeatable

## Student Learning Outcomes

- The student will be able to analyze pulmonary function studies for the purpose of identification and management of pulmonary diseases.
- The student will be able to discuss quality measures and standards for performing pulmonary function tests.

## Description

Advanced study of tests and procedures used to diagnose cardiopulmonary abnormalities and disease. Emphasis will be placed on the evaluation and interpretation of results. Intended for students in the Respiratory Care Baccalaureate Degree Program; enrollment is limited to students accepted in the program.

## Course Objectives

The student will be able to:

1. Identify indications for pulmonary function testing
2. Describe spirometry testing
3. Describe diffusion capacity tests
4. Discuss lung volume, airway resistance, and gas distribution tests
5. Discuss ventilation and ventilatory control tests
6. Describe blood gas and related tests
7. Discuss cardiopulmonary exercise testing and field tests
8. Identify special considerations for pediatric pulmonary function testing
9. Describe bronchoprovocation challenge testing
10. Identify other specialized tests related to pulmonary function
11. Identify and describe pulmonary function testing equipment
12. Describe best practice and quality assurance systems in the pulmonary function laboratory
13. Interpret results using reference values

## Course Content

1. Indications for pulmonary function testing
  - a. Pulmonary function tests (PFTs)
  - b. Indications for PFTs
  - c. Patterns of impaired pulmonary function

- d. Preliminaries to patient testing
  - e. Test performance and sequence
2. Spirometry
    - a. Vital capacity
    - b. Forced vital capacity, forced expiratory volume, and forced expiratory flow
    - c. Flow-volume curve
    - d. Peak expiratory flow
    - e. Maximum voluntary ventilation
    - f. Before-and-after bronchodilator studies
  3. Diffusing capacity tests
    - a. Carbon monoxide diffusing capacity
  4. Lung volume, airway resistance, and gas distribution tests
    - a. Lung volumes
      - i. Functional residual capacity
      - ii. Residual volume
      - iii. Total lung capacity
      - iv. Residual volume/total lung capacity ratio
    - b. Airway resistance and conductance
    - c. Gas distribution tests
      - i. Single-breath nitrogen washout
      - ii. Closing volume
      - iii. Closing capacity
    - d. Multiple breath nitrogen washout, lung clearance index, and phase III slope analysis
  5. Ventilation and ventilatory control tests
    - a. Tidal volume, rate, and minute ventilation
    - b. Respiratory dead space and alveolar ventilation
    - c. Ventilatory response tests for carbon dioxide and oxygen
    - d. High-altitude simulation test
  6. Blood gases and related tests
    - a. pH
    - b. Carbon dioxide tension
    - c. Oxygen tension
    - d. Hemoximetry
    - e. Pulse oximetry
    - f. Capnography
    - g. Shunt equation and calculation
  7. Cardiopulmonary exercise testing and field tests
    - a. Field tests
    - b. Six-minute walk test (6MWT) reference set
    - c. Exercise protocols
    - d. Exercise workload
    - e. Cardiovascular monitors during exercise
    - f. Ventilation during exercise
    - g. Oxygen consumption, carbon dioxide production, and respiratory exchange ratio during exercise
    - h. Exercise blood gases
      - i. Cardiac output during exercise
  8. Pediatric pulmonary function testing
    - a. Infant, toddler, and preschool pulmonary function testing
    - b. Spirometry
    - c. Diffusion capacity
    - d. Lung volumes

- e. Bronchoprovocation challenges
- f. Exhaled nitric oxide standards for testing
- g. Outlook for pediatric PFT labs
- 9. Bronchoprovocation challenge testing
  - a. Bronchoprovocation challenge approaches
- 10. Specialized test regimens
  - a. Respiratory muscle strength testing
  - b. Exhaled nitric oxide
  - c. Forced oscillation technique
  - d. Preoperative pulmonary function testing
  - e. Pulmonary function testing for social security disability
  - f. Metabolic measurements
    - i. Indirect calorimetry
- 11. PFT equipment
  - a. Volume-displacement spirometers
  - b. Flow-sensing spirometers
  - c. Peak flowmeters
  - d. Body plethysmographs
  - e. Breathing valves
  - f. Pulmonary gas analyzers
  - g. Blood gas analyzers, oximeters, and related devices
  - h. Computers for pulmonary function testing
- 12. Quality systems in the PFT lab
  - a. Quality manual
  - b. Quality system essentials
  - c. Path of workflow
- 13. Reference values and interpretation strategies
  - a. Selection of reference values
  - b. Establishing what is abnormal
  - c. Interpretation algorithm

## Lab Content

Not applicable.

## Special Facilities and/or Equipment

This course is taught fully online. Students need access to a computer with internet.

## Method(s) of Evaluation

Methods of Evaluation may include but are not limited to the following:

Weekly assignments  
Weekly participation in discussion forums  
Group projects

## Method(s) of Instruction

Methods of Instruction may include but are not limited to the following:

Instructor-led weekly discussion forums  
Lectures  
Instructor-led group projects

## Representative Text(s) and Other Materials

Mottram, Carl. Ruppel's Manual of Pulmonary Function Testing, 12th ed. 2023.

## Types and/or Examples of Required Reading, Writing, and Outside of Class Assignments

Weekly assigned readings from the textbook and online resources.

## Discipline(s)

Respiratory Technologies