RSPC A285: PULMONARY FUNCTION TESTING

Item	Value
Curriculum Committee Approval Date	11/04/2020
Top Code	121000 - Respiratory Care/Therapy
Units	1 Total Units
Hours	36 Total Hours (Lecture Hours 18; Lab Hours 18)
Total Outside of Class Hours	0
Course Credit Status	Credit: Degree Applicable (D)
Material Fee	Yes
Basic Skills	Not Basic Skills (N)
Repeatable	No
Grading Policy	Standard Letter (S)

Course Description

Theory and application of pulmonary function testing by mechanical and electronic devices. PREREQUISITE: RSPC A265. Transfer Credit: CSU.

Course Level Student Learning Outcome(s)

1. Describe and apply pulmonary diagnostic techniques utilized in the pulmonary function testing laboratory.

Course Objectives

- 1. Describe the uses of pulmonary function testing.
- 2. Determine normal predicted values by calculation and from nomograms, being able to correct values for temperature variation.
- 3. Describe the three different types and use of drum, wedge, and pneumotach spirometers.
- 4. Define all lung volumes and capacities.
- 5. Describe the measurement and significance of direct spirometric volumes and capacities and apply to the patient condition.
- 6. Define and describe the three methods of indirect spirometry and the measurements taken.
- 7. Determine and interpret predicted values, calculate percent predicted measurements and apply to patient conditions.
- 8. Describe the technique and measurement of flow-volume loops, including the use of helium and assess shape and form to apply to abnormal pulmonary conditions.
- 9. Describe bronchodilator and bronchial provocation testing, assessing results in terms of patient reversibility.
- 10. Describe the theory and technique of body plethysmography testing,types of tests performed including: measurement of compliance, lung mechanic measurements, interpret results and apply to patient conditions.
- 11. Describe the theory and interpret the results of diffusion capacity testing, applying to patient pulmonary conditions.
- 12. Describe metabolic and exercise testing, interpret test results and apply to patient pulmonary conditions
- 13. Identify criteria of the American Thoracic Society, sources of errors in pulmonary functions testing and requirements to maintain proper quality control.

Lecture Content

Basic spirometry / Ventilatory Measurements Use of pulmonary function studies Restrictive lung conditions Obstructive lung conditions Predicted calculations Nomograms Percent predicted calculations Volume corrections for temperature A.T.P.S. B.T.P.S. Spirometers Types Components Operation and use Definition of lung volumes and capacities Direct measurement and significance Minute volume (Ve) Tidal volume (Vt) Vital Capacity (VC) Inspiratory Capacity (IC) Expiratory Reserve Volume (ERV) Interpretation and application to patient conditions. Indirect spirometry Definition and methods for measurements Helium dilution Nitrogen washout Plethysmograph Lung mechanics / Plethysmographic tests Measurement of compliance Airway conditions Measurement of lung mechanics Spirometry tests Forced Vital Capacity (FVC) FEVtimed (FEV1) FEV1/FVC % FEF200-1200 FEF25-75 Peak Expiratory Flow Rate (PEFR) Maximum Ventilatory Volume (MVV) Flow-volume loops Measurement of the flow-volume loop Determine spirometric measurements from the flow-volume loop Loop shape and form V. Helium dilution in flow-volume looo A. Small airways diseases B. Interpretation and application VI. Reversible airway disease Bronchodilator studies Provocation tests Evaluation and application of results VII. Diffusion Capacity Testing and theory of DLCO Techniques Interpretation and application of results VIII. Quality control in the Pulmonary Function Laboratory Areas of measurement error Equipment calibration and quality Maintenance of records American Thoracic Society criteria

Lab Content

Calculate ventilatory measurements using nomogram Perform Bedside spirometric maneuvers Troubleshooting III. Perform closing volume and DLCO testing on spirometric device IV. Perform flow volume loops and lung volumes via plethysmography with body box. V. Equipment set-up, calibration and quality control on spirometric devices A. Troubleshooting VI. Exercise testing and Indirect Calorimetry A. Case Studies VII. PFT Case studies A. NBRC Clinical Simulation Exam

Method(s) of Instruction

- Lecture (02)
- DE Live Online Lecture (02S)
- Lab (04)
- DE Live Online Lab (04S)

Instructional Techniques

Lecture and application of ideas and theories; demonstration of techniques; laboratory; paired and small group exercises with instructor feedback; interactive computer instruction

Reading Assignments

Student will spend 2 hours per week reading from assigned textbook.

Writing Assignments

Students will spend 2 hours per week completing written laboratory and homework assignments to apply knowledge of pulmonary function procedures. Students will demonstrate and apply basic pulmonary function laboratory skills and procedures through completion of in-class written quizzes and final exam, performing calculations and identifying wave forms via graphs.

Out-of-class Assignments

Students will spend 2 hours per week completing written laboratory and homework assignments.

Demonstration of Critical Thinking

Written content based technical examinations; laboratory exercises; homework assignments

Required Writing, Problem Solving, Skills Demonstration

Written content based technical examinations; written laboratory and homework assignments

Eligible Disciplines

Respiratory technologies: Any bachelors degree and two years of professional experience, or any associate degree and six years of professional experience.

Textbooks Resources

1. Required Ruppel, G. Manual of Pulmonary Function Testing, 11th ed. Elsevier/Mosby publisher, 2018 Rationale: -