RSPC A260: ARTERIAL BLOOD GASES, THEORY AND PRACTICE

Item	Value
Curriculum Committee Approval Date	04/06/2016
Top Code	121000 - Respiratory Care/Therapy
Units	2 Total Units
Hours	54 Total Hours (Lecture Hours 36; 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

Interpretation of arterial blood gases, arterial puncture technique, blood gas analysis. Interpretation of fluid and electrolyte imbalances, renal physiology on acid base control. Phlebotomy theory. PREREQUISITE: RSPC A185. Transfer Credit: CSU.

Course Level Student Learning Outcome(s)

1. Correctly draw an arterial blood sample and interpret values as applied to patient assessment and outcomes including acid/base, oxygenation and electrolytes.

Course Objectives

- 1. Describe the procedure and requirements of arterial and capillary puncture.
- 2. Perform successful arterial puncture in the simulated laboratory.
- 3. Describe the principles of operation for Ph, PCO2, and PO2 electrodes.
- 4. Explain principles of arterial blood gas analyzers, quality control, and point of care.
- 5. Explain principles of, and measurements provided by both pulse oximetry and hemoximetry.
- 6. Identify, describe clinical causes, and corrective actions for elevated dyshemoglobins.
- 7. Describe basic acid-base chemistry and the Henderson-Hasselbach equation.
- 8. Interpret and analyze clinical acid-base conditions.
- 9. Describe clinical causes and corrective conditions for given acid-base situations.
- 10. Describe types of hypoxia.
- 11. Determine oxygenation status, causes for hypoxia, and appropriate therapeutic response.
- 12. Assess oxygenation though applied calculations.
- 13. Describe physiology of the nephron.
- 14. Explain the mechanisms of water regulation.
- 15. Describe the bicarbonate generation systems in relation to buffers.
- 16. Describe conditions, symptoms, effects and treatment for imbalanced sodium, potassium, and calcium.
- 17. Explain effects of electrolyte imbalances on acid-base.
- 18. Identify and evaluate components of the following blood tests and laboratory results: CBC, electrolytes, and coagulation studies.

Lecture Content

Arterial Puncture Anatomy Equipment Syringes and needle Aseptic Supplies Procedure Patient interaction Preparation of the site Arterial puncture techniques Types of arterial palpation Evaluation Handling of the sample Hazards Recognition Response/avoidance of problems Capillary Blood Gas Technique Equipment Technique Blood Gas Analysis Principles of electrode operation Ph electrode PCO2 or Severinghaus electrode PO2 or Clark electrode Calibration technique Quality Assurance Components Quality control Use of known control sample Levy-Jennings plot and standard deviation Analyzers Blood Gas Hemoximeter Point of Care Pulse Oximetry and Hemoximetry Principles of Operation Measurements Functional Saturation Fractional Saturation Dyshemoglobins Identification Treatment Acid-Base balance Concepts Acids and Bases Ph and hydrogen ion concentrations Buffer systems Hydrogen ion transfer Phosphate buffers Ammonium buffers Henderson-Hasselbach equation Evaluation of acid-base Normal conditions Acidosis respiratory metabolic Alkalosis respiratory metabolic Combined states Compensation Mixed states Oxygenation Internal respiration Aerobic Anaerobic Oxygen transport Alveolar gas equation Oxyhemoglobin Dissociation Calculation of PAO2 and oxygen content Hypoxia Types of hypoxia Pulmonary Anemic Circulatory Histotoxic Evaluation of hypoxia Oxygen assessment a-A gradient a/A ratio a-v content difference shunt Fluid and electrolytes Renal physiology Function of the nephron Body fluid regulation A.D.H. Aldosterone Electrolytes Sodium Potassium Chloride Calcium Effects on acid-base balance Components of blood tests and laboratory results Identification Evaluation CBC Electrolytes Coagulation studies

Lab Content

Perform successful arterial puncture in the simulated laboratory. Complete weekly lab assignments and practice patient case studies pertaining to content identified in the course objectives. Arterial Puncture Hemoximetry and Co-oximetry Acid-Base Interpretation Oxygenation Oxygenation Calculations Renal Physiology Water Regulation Electrolytes Blood tests and Laboratory results

Method(s) of Instruction

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

Instructional Techniques

Lecture with application of ideas, student practice and skill evaluation, simulations, patient case studies

Reading Assignments

Students will spend 3-4 hours weekly reading 1-2 textbook chapters and related primary/secondary source material per week to prepare for quizes and written examinations.

Writing Assignments

Students will spend 2.5 hours weekly on completing written ABG interpretations, patient case studies applicable to the weekly course content, and a written research paper pertaining to the ethical issues one may face as a Respiratory Therapist. There are written technical examinations including; unit exams, a midterm, and a comprehensive final examination.

Out-of-class Assignments

Students will spend 2.5 hours weekly practicing ABG interpretations, patient case studies, and completing a written research paper.

Demonstration of Critical Thinking

Written and objective examinations, written research paper, simulation practice exercises and patient case studies, skill evaluation of arterial puncture.

Required Writing, Problem Solving, Skills Demonstration

Written examinations, written research paper, ABG interpretation, skills demonstration and evaluation of arterial puncture.

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 Adelamn, D. Respiratory Care 260, ed. Costa Mesa:: Orange Coast College, 2006 Rationale: - 2. Required Kaczmarek, R.M.. Egans Fundamentals of Respiratory Care,, 10th Ed. ed. St.Louis: Elsevier Mosby, 2013 Rationale: -