Course Acronym:	RC
Course Number:	292
Descriptive Title:	Advanced Clinical Application and Interpretation of Blood Gases
Division:	Health Sciences and Athletics
Department:	Respiratory Care
Course Disciplines:	Respiratory Technologies
Catalog Description:	This course provides instruction in respiratory clinical application of blood gases. Topics include the fundamentals of acid-base and respiratory physiology; assessment and interpretation of blood gas values; blood gas values applied to patient care; validation of results with other modalities; and appropriate methods to collect, analyze, and report blood gas results.
Prerequisite:	
Co-requisite:	
Recommended Preparation:	
Enrollment Limitation:	Students must be admitted to the El Camino College Respiratory Care Program or be graduated from an accredited respiratory care program.
Hours Lecture (per week):	2
Hours Laboratory (per week):	0
Outside Study Hours:	4
Total Course Hours:	36
Course Units:	2
Grading Method:	Letter Grade only
Credit Status:	Credit, degree applicable
Transfer CSU:	Yes
Effective Date:	7-19-2010
Transfer UC:	Yes
Effective Date:	
General Education: ECC	
Term:	
Other:	
CSU GE:	
Term:	
Other:	
IGETC:	
Term:	

Other:	
Student Learning Outcomes:	**SLO #1 Interpret Arterial Blood Gas Results** Students will be able to answer written questions, oral questions and perform procedures that demonstrate knowledge and ability to interpret arterial blood gas results on patients receiving all types of respiratory care for various pulmonary disorders. **SLO #2 Solve ABG Problems** During classes students will demonstrate and explain arterial blood gas problems and ways to ensure accuracy of reported blood gas results using the latest ABG equipment available for patient care. **SLO #3 Demonstrate Cognitive Knowledge of Arterial Blood Gases Analysis and Interpretation** Students who stay in the course until the end of semester will take a comprehensive final multiple choice examination on obtaining, analyzing and interpreting arterial blood gases and 80% will obtain a grade of 70% or better.
Course Objectives:	1. Describe the mechanisms of respiratory physiology. 2. Differentiate the classifications of metabolic and respiratory acid-base balance. 3. Assess normal ranges and interpretive guidelines for blood gases. 4. Examine and describe the clinical approach and assessment of cellular oxygenation, dead space ventilation, and shunt-producing pathology. 5. Classify the differences in treating various patient conditions based on blood gas results. 6. Identify alternative methods to verify blood gas results. 7. Explain how to obtain a blood gas sample. 8. Describe quality control and regulations for blood gas sampling. 9. Discuss competency regulations for blood gas sampling.
Major Topics:	**I. Introduction to Respiratory Physiology and Respiration (1 hour, lecture)** **II. Acid-Base Balance (2 hours, lecture)** A. Metabolic B. Respiratory **III. Arterial Oxygenation (3 hours, lecture)** A. Hemoglobin B. Bohr and Haldane Effects C. Hemoglobin Dissociation Curve D. Physiology of Arterial Oxygenation E. Pathophysiologic Mechanisms of Hypoxemia F. Cardiopulmonary Compensation for Hypoxemia **IV. Normal Ranges and Interpretive Guidelines (3 hours, lecture)** A. Respiratory Failure and Blood Gases B. Defining Normal Ranges C. Partial Pressure of Carbon Dioxide in the Arterial Blood and pH Relationship D. Partial Pressure of Carbon Dioxide in the Arterial Blood and Plasma Bicarbonate Relationship E. Total Ventilation-Alveolar Ventilation Relationship F. Arterial Oxygen Tensions G. Arterial Oxyhemoglobin Saturation H. Determining Base Excess/Deficit **V. Clinical Approach to Interpretation (3 hours, lecture)** A. Concept of ventilatory failure B. Alveolar Hyperventilation

	C. Clinical terminology D. Interpretive approach **VI. Assessments (4 hours, lecture)** A. Lung as an oxygenator B. Cellular oxygenation C. Deadspace ventilation D. Deadspace and shunt-producing pathology **VII. Blood Gas Values Applied to Patient Care (6 hours, lecture)** A. Hypoxemia and oxygen therapy B. Carbon dioxide C. Metabolic acid-base imbalances D. Resuscitation and blood gases E. Pulmonary Embolic Phenomena F. Dyshemoglobinemias G. Positive Airway Pressure Therapy H. Natural factors affecting blood gases I. Temperature correction of blood gas values J. Clinical causes of abnormal blood gases **VIII. Bedside Appraisal of Blood Gases (6 hours, lecture)** A. Capnography B. Continuous oximetry C. Transcutaneous gas monitoring D. Blood gas monitors E. Transcutaneous gas electrodes F. Exhaled carbon dioxide measurement **IX. Technical Considerations (4 hours, lecture)** A. Obtaining blood gas samples B. Blood gas analyzers C. Oximetric measurement **X. Quality Assurance in Blood Gas Analysis (4 hours, lecture)** A. Regulatory agencies B. Quality control C. Quality assurance plan D. Performance improvement E. Competency
Total Lecture Hours:	36
Total Laboratory Hours:	0
Total Hours:	36
Primary Method of Evaluation:	2) Problem solving demonstrations (computational or non-computational)
Typical Assignment Using Primary Method of Evaluation:	Write a three- to five-page report on the standardized methods to verify daily quality control samples. Explain the methods a clinician would use to determine whether or not the sample is in compliance, including the method to determine the sample's standard deviations. Moreover, explain current compliance regulations for clinician competency, and give reasons for these types of regulations.
Critical Thinking Assignment 1:	Using the information from the lecture, class discussion and your text, interpret the identified blood gas. Explain the underlying respiratory physiology and possible treatments.
Critical Thinking Assignment 2:	In a one-page paper, explain how blood gases are used to evaluate the patient's status during cardiac resuscitation. Explain other clinical methods to verify the obtained results.

Other Evaluation Methods:	Completion, Fieldwork, Homework Problems, Matching Items, Multiple Choice, Other Exams, Performance Exams, Quizzes, Term or Other Papers, True/False, Written Homework
Instructional Methods:	Discussion, Group Activities, Lab, Lecture, Role play/simulation
If other:	
Work Outside of Class:	Answer questions, Required reading, Skill practice, Study, Written work (such as essay/composition/report/analysis/research)
If Other:	
Up-To-Date Representative Texts:	James Stoller. Fundamentals of Respiratory Care. 13th ed. Elsevier, 2024.
Alternative Texts:	
Required Supplementary Readings:	
Other Required Materials:	
Requisite:	
Category:	
Requisite course(s): List both prerequisites and corequisites in this box.	
Requisite and Matching skill(s):Bold the requisite skill. List the corresponding course objective under each skill(s).	
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Enrollment Limitations Impact:	Students begin the clinical phase (A.S. degree requirements) of the Respiratory Care program after being accepted into the program.
Course Created by:	Salomay Corbaley
Date:	08/12/2015
Original Board Approval Date:	07/19/2010
Last Reviewed and/or Revised by:	Roy Mekaru
Date:	03/22/2024
Last Board Approval Date:	06/17/2024
Effective Term:	FA 2025