RESP 114-RESPIRATORY PHYSICS AND MEDICAL GAS THERAPY COURSE

3 CREDITS

SYLLABUS

CATALOG DESCRIPTION

This course introduces the basic concepts in physics and the applications of gas laws in respiratory therapy. It discusses the physical characteristics of medical gases, production, regulation, storage and distribution, and the therapeutic and diagnostic uses of oxygen.

Prerequisites:	Acceptance into the Respiratory Therapy Program
Co-Requisites:	RESP 110, 112, 118, 236
Semester Offered:	Fall Semester

Common Student Learning Outcomes

Upon successful completion of San Juan College programs and degrees, the student will demonstrate competency in…

BROAD AND SPECIALIZED LEARNING

Students will actively and independently acquire, apply, and adapt skills and knowledge with an awareness of global contexts.

CRITICAL THINKING

Students will think analytically and creatively to explore ideas, make connections, draw conclusions and solve problems.

CULTURAL AND CIVIC ENGAGEMENT

Students will act purposefully, reflectively, and ethically in diverse and complex environments.

EFFECTIVE COMMUNICATION

Students will exchange ideas and information with clarity in multiple contexts.

INFORMATION LITERACY

Students will be able to recognize when information is needed and have the ability to locate, evaluate, and use it effectively.

INTEGRATING TECHNOLOGIES

Students will demonstrate fluency in the application and use of technologies in multiple contexts.

Student work from this class may be randomly selected and used anonymously for assessment of course, program, and/or institutional learning outcomes. For more information, please refer to the Dean of the appropriate School.

Course Learning Outcomes

GENERAL LEARNING OBJECTIVES

Upon successful completion of the course, the student will be able to:

Discuss the importance and applications of gas physics in respiratory therapy.

Define and differentiate gas pressure, gas flow and movement of gas molecules:

1. Discuss which gases and gas mixtures are used clinically and how they are produced.

2. Discuss and differentiate the different gas storage systems and station outlets.
3. Discuss gas cylinders and oxygen regulatory devices.
4. Compute the duration of flow for compressed and liquid gas therapy.
5. Briefly describe the principles of common oxygen analyzers.
6. Discuss the need for oxygen therapy and how to evaluate a patient's response.
7. Demonstrate the oxygen therapy procedure and how to check for proper function.

SPECIFIC LEARNING OBJECTIVES

Upon successful completion of the course, the student will be able to:

1. Discuss the importance and applications of gas physics in respiratory therapy:
   A. Define physics and identify its applications in respiratory therapy.
   B. Describe the composition, behavior and states of matter.
   C. Identify and differentiate the different gas laws: Boyle's law, Charles' law, Gay-Lussac's law, Dalton's law of partial pressure, and the combined gas laws.
   D. Given a problem, calculate to solve for a gas law.
   E. Calculate conversion of temperature in degree Centigrade to Kelvin.
   F. Define standard temperature and pressure.
   G. Identify gases in the atmosphere.

2. Define and differentiate gas pressure, gas flow and movement of gas molecules:
   A. Poiseuille's Law
   B. Bernoulli's principle
   C. Venturi's principle
   D. Gas Flow dynamics
   E. Laminar Flow
   F. Turbulent Flow
   G. Fick's Law
   H. Henry's Law of solubility
   I. Graham's Law of Diffusion
   J. Surface Tension

3. Discuss which gases and gas mixtures are used clinically and how they are produced:
   A. Oxygen
   B. Helium
   C. Carbon dioxide
   D. Nitric oxide
   E. Hyperbaric oxygen
   F. He/Ox mixture

4. Discuss and differentiate the different gas storage systems and station outlets:
   A. Liquid bulk
   B. Pipeline supply
   C. Gas cylinder
   D. Zone valves and station outlets

5. Discuss gas cylinders and oxygen regulatory devices:
   A. Safety
   B. Size
   C. Storage

D. Cylinder valves- design and safety system
E. Reducing valves
F. Regulators
G. Flowmeters
H. Blenders

6. Compute the duration of flow for compressed and liquid gas therapy:
   A. Helium/oxygen flow
   B. Duration of gas flow from a liquid oxygen system
   C. Correct flow at different altitudes

7. Briefly describe the principles of the following oxygen analyzers:
   A. Galvanic
   B. Polarographic

8. Discuss the need for oxygen therapy and how to evaluate a patient's response:
   A. Review the AARC Clinical Practice Guidelines for indications for oxygen therapy in acute and extended care.
   B. List and explain the hazards and complications of oxygen therapy.
   C. Define and list the categories of hypoxia.
   D. Evaluate and monitor a patient's response to oxygen therapy.

9. Demonstrate the oxygen therapy procedure and check for proper function of devices:
   A. Demonstrate the use of different oxygen delivery devices.
   B. Select an oxygen delivery system appropriate for the respiratory care plan.
   C. Assemble, check for proper function, and identify malfunctions in gas delivery equipment.
   D. Regulate gas pressure and control flow.

ASSESSMENT TECHNIQUES

1. Quizzes
2. Homework/Project
3. Skills Competencies
4. Mid-term Exam
5. Final Exam

ACCOMMODATIONS STATEMENT

Students who need accommodations (i.e., note-taker, interpreter, special seating, etc.) need to provide accommodation notices to the instructor. Students can contact the Students with Disabilities on Campus (SDOC) Coordinator in the Counseling Center, located in the Administration Building, to make arrangements and provide documentation in accordance with the Americans with Disabilities Act of 1990.

ACADEMIC HONESTY RULES

San Juan College expects all students to adhere to the Academic Honesty Rules as posted on our website, http://www.sanjuancollege.edu/academichonesty. All Health Sciences Programs have a responsibility to ensure enrolled students and graduates are safe, ethical and competent practitioners. To ensure professionalism, students and faculty must uphold and abide by college and program accreditation specific policies.

SYLLABUS DEVELOPED AND/OR REVIEWED BY:

Dean of Health Sciences: _____ Date: _____

Director of Respiratory Therapy: _____ Date: _____

Clinical Coordinator of RT: _____ Date: _____