

2009 Mississippi Curriculum Framework

Postsecondary Respiratory Care Technology

(Program CIP: 51.0908 – Respiratory Care Practitioner)

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Standards in this document are based on information from the following organizations:

Standards and Guidelines for Respiratory Care Technology Programs

National Board for Respiratory Care, Content Outline for
the Registry Examination for Advanced Respiratory
Therapists (RRT), RRT Examination Matrix, Content
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Related Academic Standards

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Preface

Respiratory Care Technology Research Synopsis

Articles, books, Web sites, and other materials listed at the end of each course were considered during the revision process. Specific journals, articles, and resources were especially useful in providing insight into trends and issues in the field. These references are suggested for use by instructors and students during the study of the topics outlined.

Industry advisory team members from colleges throughout the state were asked to give input related to changes to be made to the curriculum framework. Specific comments related to soft skills needed in this program included positive attitude, dependability, team player attitude, flexibility, punctuality, good work ethic, initiative, and communication. Occupational-specific skills stated included computer use, math skills, calculating dosages, being technologically literate, and respiratory specific clinical skills. Safety practices emphasized included adhering to standard precautions, following OSHA and HIPPA guidelines, and ergonomics.

Instructors from colleges throughout the state were also asked to give input on changes to be made to the curriculum framework. Specific comments related to this program included statements from advisory committee members including to provide more flexibility in scheduling to improve the productivity of clinical time. In addition, it was suggested that more standardized testing prep be given to students. Changes suggested for the curriculum included improve the content of Respiratory Pharmacology, remove the lab hours from Respiratory Care Science, increase the time in Respiratory Care Seminar, and add optional pathways such as polysomnography.

Curriculum

The following national standards were referenced in each course of the curriculum:

- CTB/McGraw-Hill LLC *Tests of Adult Basic Education, Forms 7 and 8 Academic Standards*
- *21st Century Skills*
- *The National Board for Respiratory Care Inc., Registry Examination for Advanced Respiratory Therapists (RRT), RRT Examination Matrix, Content Area*

Industry and instructor comments, along with current research, were considered by the curriculum revision team during the revision process, and changes were made as needed and appropriate. Many of the skills and topics noted in the research were already included in the curriculum framework. Specific changes made to the curriculum at the April 2008 curriculum revision meeting included the following:

- Competencies and objectives were reviewed to ensure accuracy and appropriateness.
- Competencies and objectives related to the revised standards for an accredited educational program were added or changed.
- The program name Respiratory Therapy was changed to Respiratory Care Technology.
- The course Respiratory Care Science was changed from a 4-hour course to a 3- hour course with no lab hours.
- The course Respiratory Care Seminar was changed from a 2- hour course to a 3- hour course.

- The course names for Respiratory Care Practitioner I, II, and III were changed to Respiratory Care Technology I, II, and III, respectively.
- Physics was added as an elective.
- Intermediate Algebra, or higher, was added as an elective.
- The reference list was updated.
- The Recommended Tools and Equipment list was updated.

Assessment

Students will be assessed using the NBRC Entry Level Exam. Upon successful completion of the entry level exam, graduates will be eligible to sit for the NBRC Advanced Practitioners Exam.

Professional Learning

It is suggested that instructors participate in professional learning related to the following concepts:

- How to use the program Blackboard site
- Differentiated instruction – To learn more about differentiated instruction, please go to http://www.paec.org/teacher2teacher/additional_subjects.html and click on Differentiated Instruction. Work through this online course, and review the additional resources.

Articulation

No articulated credit will be offered upon implementation of this curriculum by the college.

Foreword

As the world economy continues to evolve, businesses and industries must adopt new practices and processes in order to survive. Quality and cost control, work teams and participatory management, and an infusion of technology are transforming the way people work and do business. Employees are now expected to read, write, and communicate effectively; think creatively, solve problems, and make decisions; and interact with each other and the technologies in the workplace. Vocational–technical programs must also adopt these practices in order to provide graduates who can enter and advance in the changing work world.

The curriculum framework in this document reflects these changes in the workplace and a number of other factors that impact on local vocational–technical programs. Federal and state legislation calls for articulation between high school and community college programs, integration of academic and vocational skills, and the development of sequential courses of study that provide students with the optimum educational path for achieving successful employment. National skills standards, developed by industry groups and sponsored by the U.S. Department of Education and Labor, provide vocational educators with the expectations of employers across the United States. All of these factors are reflected in the framework found in this document.

Referenced throughout the courses of the curriculum are the 21st Century Skills, which were developed by the Partnership for 21st Century Skills, a group of business and education organizations concerned about the gap between the knowledge and skills learned in school and those needed in communities and the workplace. A portion of the 21st Century Skills addresses learning skills needed in the 21st century, including information and communication skills, thinking and problem-solving skills, and interpersonal and self-directional skills. The need for these types of skills has been recognized for some time, and the 21st Century Skills are adapted in part from the 1991 report from the U.S. Secretary of Labor’s Commission on Achieving Necessary Skills (SCANS). Another important aspect of learning and working in the 21st century involves technology skills, and the International Society for Technology in Education, developers of the National Educational Technology Standards (NETS), were strategic partners in the Partnership for 21st Century Skills.

Each postsecondary program of instruction consists of a program description and a suggested sequence of courses that focus on the development of occupational competencies. Each vocational–technical course in this sequence has been written using a common format that includes the following components:

- Course Name – A common name that will be used by all community/junior colleges in reporting students
- Course Abbreviation – A common abbreviation that will be used by all community/junior colleges in reporting students
- Classification – Courses may be classified as the following:
 - Vocational–technical core – A required vocational– technical course for all students

- Area of concentration (AOC) core – A course required in an area of concentration of a cluster of programs
 - Vocational– technical elective – An elective vocational– technical course
 - Related academic course – An academic course that provides academic skills and knowledge directly related to the program area
 - Academic core – An academic course that is required as part of the requirements for an associate degree
- Description – A short narrative that includes the major purpose(s) of the course and the recommended number of hours of lecture and laboratory activities to be conducted each week during a regular semester
 - Prerequisites – A listing of any courses that must be taken prior to or on enrollment in the course
 - Corequisites – A listing of courses that may be taken while enrolled in the course
 - Competencies and Suggested Objectives – A listing of the competencies (major concepts and performances) and of the suggested student objectives that will enable students to demonstrate mastery of these competencies

The following guidelines were used in developing the program(s) in this document and should be considered in compiling and revising course syllabi and daily lesson plans at the local level:

- The content of the courses in this document reflects approximately 75% of the time allocated to each course. The remaining 25% of each course should be developed at the local district level and may reflect the following:
 - Additional competencies and objectives within the course related to topics not found in the state framework, including activities related to specific needs of industries in the community college district
 - Activities that develop a higher level of mastery on the existing competencies and suggested objectives
 - Activities and instruction related to new technologies and concepts that were not prevalent at the time the current framework was developed/revised
 - Activities that implement components of the Mississippi Tech Prep initiative, including integration of academic and vocational–technical skills and coursework, school-to-work transition activities, and articulation of secondary and postsecondary vocational–technical programs
 - Individualized learning activities, including work site learning activities, to better prepare individuals in the courses for their chosen occupational areas
- Sequencing of the course within a program is left to the discretion of the local district. Naturally, foundation courses related to topics such as safety, tool and equipment usage, and other fundamental skills should be taught first. Other courses related to specific skill areas and related academics, however, may be sequenced to take advantage of seasonal and climatic conditions, resources located outside of the school, and other factors.

- Programs that offer an Associate of Applied Science degree must include a minimum 15 semester credit hour academic core. Specific courses to be taken within this core are to be determined by the local district. Minimum academic core courses are as follows:
 - 3 semester credit hours Math/Science Elective
 - 3 semester credit hours Written Communications Elective
 - 3 semester credit hours Oral Communications Elective
 - 3 semester credit hours Humanities/Fine Arts Elective
 - 3 semester credit hours Social/Behavioral Science Elective

It is recommended that courses in the academic core be spaced out over the entire length of the program so that students complete some academic and vocational–technical courses each semester. Each community/junior college has the discretion to select the actual courses that are required to meet this academic core requirement.

- In instances where secondary programs are directly related to community and junior college programs, competencies and suggested objectives from the high school programs are listed as Baseline Competencies. These competencies and objectives reflect skills and knowledge that are directly related to the community and junior college vocational–technical program. In adopting the curriculum framework, each community and junior college is asked to give assurances that:
 - Students who can demonstrate mastery of the Baseline Competencies do not receive duplicate instruction and
 - Students who cannot demonstrate mastery of this content will be given the opportunity to do so.
- The roles of the Baseline Competencies are to:
 - Assist community/junior college personnel in developing articulation agreements with high schools and
 - Ensure that all community and junior college courses provide a higher level of instruction than their secondary counterparts.
- The Baseline Competencies may be taught as special “Introduction” courses for 3–6 semester hours of institutional credit that will not count toward associate degree requirements. Community and junior colleges may choose to integrate the Baseline Competencies into ongoing courses in lieu of offering the “Introduction” courses or may offer the competencies through special projects or individualized instruction methods.
- Technical elective courses have been included to allow community colleges and students to customize programs to meet the needs of industries and employers in their areas.

In order to provide flexibility within the districts, individual courses within a framework may be customized by:

- Adding new competencies and suggested objectives;
- Revising or extending the suggested objectives for individual competencies;
- Integrating baseline competencies from associated high school programs; and

- Adjusting the semester credit hours of a course to be up 1 hour or down 1 hour (after informing the State Board for Community and Junior Colleges [SBCJC] of the change).

In addition, the curriculum framework as a whole may be customized by:

- Resequencing courses within the suggested course sequence;
- Developing and adding a new course that meets specific needs of industries and other clients in the community or junior college district (with SBCJC approval); and
- Utilizing the technical elective options in many of the curricula to customize programs.

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Program Description

The Respiratory Care Technology program prepares individuals to become respiratory therapists. Respiratory therapists, as members of a team of health-care professionals, work to evaluate, treat, and manage patients of all ages with respiratory, cardiac, and other systemic illnesses. Respiratory therapists are responsible for airway management and the setup and monitoring of life support systems. They provide treatment for heart and lung disorders by administering inhalation treatments, oxygen, drugs, and other therapeutic modalities.

In addition to performing respiratory care procedures, respiratory therapists are involved in clinical decision making (such as patient evaluation, treatment selection, and assessment of treatment efficacy) and patient education. The scope of practice for respiratory therapy includes, but is not limited to, the following:

- Acquiring and evaluating clinical data
- Assessing the cardiopulmonary status of patients
- Performing and assisting in the performance of prescribed diagnostic studies such as drawing blood samples, performing blood gas analysis, and pulmonary function testing
- Utilizing data to assess the appropriateness of prescribed respiratory care
- Establishing therapeutic goals for patients with cardiopulmonary disease
- Participating in the development and modification of respiratory care plans
- Case management of patients with cardiopulmonary and related diseases
- Initiating ordered respiratory care, evaluating and monitoring patients' responses to such care, modifying the prescribed respiratory therapy and cardiopulmonary procedures, and life support endeavors to achieve desired therapeutic objectives
- Initiating and conducting prescribed pulmonary rehabilitation
- Providing patient, family, and community education
- Promoting cardiopulmonary wellness, disease prevention, and disease management
- Participating in life support activities as required
- Promoting evidence-based medicine, research, and clinical practice guidelines

Respiratory therapists carry out these duties in a wide variety of clinical settings and are expected to act in a professional manner and conform to the standards and ethics of all health-care professionals. Professional standards integrated into this curriculum include the Commission on Accreditation of Allied Health Education Programs Standards and Guidelines for the Profession of Respiratory Care (CoARC/CAAHEP), the National Health Care Skills Standards, and standards for the National Board for Respiratory Care (NBRC).

Graduates of the Respiratory Therapy program are eligible to sit for the NBRC Entry Level Exam. Upon successful completion of the entry level exam, graduates will be eligible to sit for the NBRC Advanced Practitioners Exam.

Suggested Course Sequence*

Respiratory Care Technology

Baseline Competencies for Respiratory Care Practitioner**

Prerequisites Anatomy and Physiology I (BIO 1514 or 2514)
 Pre/Corequisites Anatomy and Physiology II (BIO 1524 or 2524)

FIRST YEAR

4 sch Math/Science Elective [†] 3 sch Cardiopulmonary Anatomy and Physiology (RCT 1313) 3 sch Patient Assessment and Planning (RCT 1223) 3 sch Respiratory Care Science (RCT 1213) <hr style="width: 20%; margin-left: 0;"/> 13 sch	3 sch Written Communications Elective 6 sch Clinical Practice I (RCT 1516) 3 sch Respiratory Care Pharmacology (RCT 1613) 6 sch Respiratory Care Technology I (RCT 1416) <hr style="width: 20%; margin-left: 0;"/> 18 sch
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SUMMER TERM

4 sch Clinical Practice II (RCT 1524)
 4 sch Respiratory Care Technology II (RCT 1424)
 2 sch Pulmonary Function Testing (RCT 1322)
 3 sch Humanities/Fine Arts Elective

 13 sch

SECOND YEAR

3 sch Oral Communications Elective 4 sch Respiratory Care Technology III (RCT 2434) 3 sch Cardiopulmonary Pathology (RCT 2333) 4 sch Clinical Practice III (RCT 2534) <hr style="width: 20%; margin-left: 0;"/> 14 sch	3 sch Behavioral/Social Science Elective 3 sch Respiratory Care Seminar (RCT 2713) 6 sch Clinical Practice IV (RCT 2546) 3 sch Neonatal/Pediatrics Management (RCT 2613) <hr style="width: 20%; margin-left: 0;"/> 15 sch
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* Students who lack entry-level skills in math, English, science, and so forth will be provided related studies.

** Baseline competencies are taken from the high school Allied Health program. Students who can document mastery of these competencies should not receive duplicate instruction. Students who cannot demonstrate mastery will be required to do so.

† APPROVED MATH/SCIENCE ELECTIVES
Intermediate Algebra (MAT 1233) or higher
Fundamentals of Microcomputer Applications (CPT 1113)
Principles of Chemistry I (CHE 1314)
Principles of Chemistry II (CHE 1324)
General Chemistry I (CHE 1214)
Microbiology (BIO 2924)
Physics (PHY 1214)

TECHINCAL ELECTIVES (May be taken in addition to required courses)

Medical Terminology (MET 1113)
Medical Office Terminology I (MET 1613)
Respiratory Care Practicum [RCT 111 (1-3)]

Respiratory Therapy Courses

Course Name: Respiratory Care Practicum

Course Abbreviation: RCT 111(1-3)

Classification: Vocational–Technical Elective

Description: This course is designed to provide the student with extended observational time with limited participation in respiratory care modalities. The student gains knowledge of health-care providers and of the respiratory care practitioner’s role. This is an elective course for the first year students. (1–3 sch: 3–9 hr clinical)

Competencies and Suggested Objectives	
1.	Describe the roles of various personnel within the respiratory care department. <ol style="list-style-type: none"> a. Observe personnel within the department. b. Develop a written job description for the roles of the various respiratory care practitioners (RCPs) observed. c. Students will be instructed in HIPAA guidelines prior observations.
2.	Interpret the role of the patient of the RCP in the health-care delivery system. <ol style="list-style-type: none"> a. Develop a written summary of patients’ rights. b. Discuss conflict and conflict resolution.
3.	Interpret the role of the RCP in the health-care delivery system. <ol style="list-style-type: none"> a. Discuss the role of the RCP in the health-care delivery system. b. Develop a written summary of your impression of the role of the RCP in the health care setting.
4.	Complete a case study on a patient that you observed in the clinical setting. <ol style="list-style-type: none"> a. Observe a patient in the clinical setting receiving respiratory care modalities. b. Present an oral presentation on the patient to your peers and faculty.

STANDARDS

Standards and Guidelines for Respiratory Programs

- NBI Patient Data Evaluation and Recommendations: review existing data in the patient record; collect and evaluate additional pertinent clinical information; and recommend procedures to obtain additional data.
- NBII Equipment Application and Cleanliness: select, assemble, use and troubleshoot equipment; ensure infection control; and perform quality control procedures.

Related Academic Standards

- R1 Interpret Graphic Information (forms, maps, reference sources)
- R2 Words in Context (same and opposite meaning)
- R3 Recall Information (details, sequence)

Postsecondary Respiratory Care Technology

- R4 Construct Meaning (main idea, summary/paraphrase, compare/contrast, cause–effect)
- R5 Evaluate/Extend Meaning (fact/opinion, predict outcomes, point of view)
- M1 Addition of Whole Numbers (no regrouping, regrouping)
- M2 Subtraction of Whole Numbers (no regrouping, regrouping)
- M3 Multiplication of Whole Numbers (no regrouping, regrouping)
- M4 Division of Whole Numbers (no remainder, remainder)
- M5 Decimals (addition, subtraction, multiplication, division)
- M6 Fractions (addition, subtraction, multiplication, division)
- M7 Integers (addition, subtraction, multiplication, division)
- M8 Percents
- M9 Algebraic Operations
- A1 Numeration (ordering, place value, scientific notation)
- A2 Number Theory (ratio, proportion)
- A3 Data Interpretation (graph, table, chart, diagram)
- A4 Pre-Algebra and Algebra (equations, inequality)
- A5 Measurement (money, time, temperature, length, area, volume)
- A6 Geometry (angles, Pythagorean theory)
- A7 Computation in Context (whole numbers, decimals, fractions, algebraic operations)
- A8 Estimation (rounding, estimation)
- L1 Usage (pronoun, tense, subject–verb agreement, adjective, adverb)
- L2 Sentence Formation (fragments, run-on, clarity)
- L3 Paragraph Development (topic sentence, supporting sentence, sequence)
- L4 Capitalization (proper noun, titles)
- L5 Punctuation (comma, semicolon)
- L6 Writing Conventions (quotation marks, apostrophe, parts of a letter)
- S1 Vowel (short, long)
- S2 Consonant (variant spelling, silent letter)
- S3 Structural Unit (root, suffix)

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21st Century Skills

- CS1 Global Awareness
- CS2 Financial, Economic, and Business Literacy
- CS3 Civic Literacy
- CS4 Information and Communication Skills
- CS5 Thinking and Problem-Solving Skills
- CS6 Interpersonal and Self-Directional Skills

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Course Name: Respiratory Care Science

Course Abbreviation: RCT 1213

Classification: Vocational–Technical Core

Description: This course is designed to introduce the student respiratory care therapist to fundamental elements important to the delivery of health care in a safe, efficient, and professional manner. (3 sch: 3-hr lecture)

Pre/Corequisites: Anatomy and Physiology I (BIO 1514 or 2514) and Anatomy and Physiology II (BIO 1524 or 2524)

Competencies and Suggested Objectives	
1.	Discuss aspects of patient safety. <ol style="list-style-type: none"> Demonstrate basic life support. Discuss disaster planning and bioterrorism responses. Demonstrate understanding of OSHA regulations and standard precautions. Demonstrate proper use of body mechanics. Discuss fire and electrical safety. Discuss principles of accident prevention.
2.	Discuss aspects of patient comfort. <ol style="list-style-type: none"> Discuss cultural diversity. Apply effective communication skills in the various health-care settings. Discuss patient management in regard to death and dying.
3.	Discuss various aspects of the health-care delivery system. <ol style="list-style-type: none"> Discuss the role of various health-care providers, including respiratory therapists. Discuss the organization and functions of a respiratory care department. Discuss the legal aspects of respiratory care, including licensure and credentialing. Discuss the history of respiratory care. Discuss ethical considerations in respiratory care. Discuss professional considerations in respiratory care. Discuss medical billing and reimbursement.
4.	Discuss related medical terminology. <ol style="list-style-type: none"> Discuss terms related to anatomy and physiology. Discuss terms related to human disease. Discuss terms related to patient assessment and diagnosis. Discuss terms related to the treatment of disease.
5.	Describe the role microbiology and infection control play in health care. <ol style="list-style-type: none"> Describe the major classifications of microorganisms and the pathological role of each in human disease. Describe how microorganisms are identified and the role identification plays in treatment. Describe sputum sampling, gram-stain, culture, and sensitivities. Describe infection control methods used in respiratory care. Describe the elimination of infectious sources.

	<p>(1) Describe proper methods of equipment decontamination.</p> <p>(2) Describe various methods of sterilization and disinfection.</p> <p>(3) Describe methods of monitoring infection control practices.</p> <p>(4) Apply isolation procedures.</p> <p>(5) Describe the spread of infection and how to break the chain of contamination.</p>
6.	<p>Demonstrate mathematics as applied to respiratory care.</p> <p>a. Perform metric conversions.</p> <p>b. Perform decimal and percent conversions.</p> <p>c. Calculate ratio and proportion.</p> <p>d. Solve for linear equations.</p> <p>e. Apply order of operations.</p> <p>f. Plot a graph using rules of X-Y coordinates.</p> <p>g. Perform temperature conversions.</p>
7.	<p>Discuss chemistry and physics as related to respiratory care.</p> <p>a. Discuss states of matter and how each state changes.</p> <p>b. Discuss gas laws.</p> <p>c. Discuss fluid dynamics.</p> <p>d. Discuss atomic structure.</p> <p>e. Discuss acids, bases, and the pH scale.</p> <p>f. Discuss solutions, body fluids, and electrolyte balance.</p> <p>g. Discuss temperature scales, and solve conversion problems.</p> <p>h. Discuss absolute and relative humidity.</p> <p>i. Discuss and calculate compliance and resistance changes in the pulmonary system.</p>
8.	<p>Discuss methods of data management in respiratory care.</p> <p>a. Discuss computer applications in respiratory care.</p> <p>b. Apply various aspects, methods, and formats of record keeping.</p>

STANDARDS

Standards and Guidelines for Respiratory Programs

NBI	Patient Data Evaluation and Recommendations: review existing data in the patient record; collect and evaluate additional pertinent clinical information; and recommend procedures to obtain additional data.
NBII	Equipment Application and Cleanliness: select, assemble, use and troubleshoot equipment; ensure infection control; and perform quality control procedures.

Related Academic Standards

R1	Interpret Graphic Information (forms, maps, reference sources)
R2	Words in Context (same and opposite meaning)
R3	Recall Information (details, sequence)
R4	Construct Meaning (main idea, summary/paraphrase, compare/contrast, cause-effect)
R5	Evaluate/Extend Meaning (fact/opinion, predict outcomes, point of view)
M1	Addition of Whole Numbers (no regrouping, regrouping)

- M2 Subtraction of Whole Numbers (no regrouping, regrouping)
- M3 Multiplication of Whole Numbers (no regrouping, regrouping)
- M4 Division of Whole Numbers (no remainder, remainder)
- M5 Decimals (addition, subtraction, multiplication, division)
- M6 Fractions (addition, subtraction, multiplication, division)
- M7 Integers (addition, subtraction, multiplication, division)
- M8 Percents
- M9 Algebraic Operations
- A1 Numeration (ordering, place value, scientific notation)
- A2 Number Theory (ratio, proportion)
- A3 Data Interpretation (graph, table, chart, diagram)
- A4 Pre-Algebra and Algebra (equations, inequality)
- A5 Measurement (money, time, temperature, length, area, volume)
- A6 Geometry (angles, Pythagorean theory)
- A7 Computation in Context (whole numbers, decimals, fractions, algebraic operations)
- A8 Estimation (rounding, estimation)
- L1 Usage (pronoun, tense, subject–verb agreement, adjective, adverb)
- L2 Sentence Formation (fragments, run-on, clarity)
- L3 Paragraph Development (topic sentence, supporting sentence, sequence)
- L4 Capitalization (proper noun, titles)
- L5 Punctuation (comma, semicolon)
- L6 Writing Conventions (quotation marks, apostrophe, parts of a letter)
- S1 Vowel (short, long)
- S2 Consonant (variant spelling, silent letter)
- S3 Structural Unit (root, suffix)

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21st Century Skills

- CS1 Global Awareness
- CS2 Financial, Economic, and Business Literacy
- CS3 Civic Literacy
- CS4 Information and Communication Skills
- CS5 Thinking and Problem-Solving Skills
- CS6 Interpersonal and Self-Directional Skills

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Course Name: Patient Assessment and Planning

Course Abbreviation: RCT 1223

Classification: Vocational–Technical Core

Description: This course is a fundamental approach to subjective and objective evaluation, assessment, and care plan formation for the individual needs of the patient. It is an introduction to cardiopulmonary diseases including etiology, pathophysiology, complications, occurrences, clinical manifestations, treatment, and prevention. (3 sch: 2-hr lecture, 2-hr lab)

Pre/Corequisite: Anatomy and Physiology I (BIO 1514 or 2514) and Anatomy and Physiology II (BIO 1524 or 2524)

Competencies and Suggested Objectives	
1.	Utilize Subjective Objective Assessment Plan (SOAP) principles to develop and modify care plans for patients with cardiopulmonary disorders. <ol style="list-style-type: none"> Review pertinent existing data in the patient record. Evaluate additional pertinent clinical information to implement, evaluate, and modify existing patient care plan. Recommend modifications in the Respiratory Care Plan based on the patient's response. Assess patient's overall cardiopulmonary status by palpation, inspection, and auscultation. Differentiate between obstructive and restrictive lung disorders.
2.	Explain the etiology, pathophysiology, clinical manifestations, diagnosis, and treatment of cardiopulmonary diseases and conditions. <ol style="list-style-type: none"> Evaluate pertinent laboratory values. Perform basic patient assessment skills as related to respiratory care. Evaluate a patient's learning needs as related to age and language appropriateness, education level, prior disease and medication knowledge, and other factors. Develop a quality improvement program. Review an interdisciplinary patient and family care plan.

STANDARDS

Standards and Guidelines for Respiratory Programs

- NBI Patient Data Evaluation and Recommendations: review existing data in the patient record; collect and evaluate additional pertinent clinical information; and recommend procedures to obtain additional data.
- NBII Equipment Application and Cleanliness: select, assemble, use and troubleshoot equipment; ensure infection control; and perform quality control procedures.
- NBIII Therapeutic procedure initiation and modification: maintain records and communicate information; maintain a patent airway including the care of artificial airways; remove bronchopulmonary secretions; achieve adequate respiratory support; evaluate and

monitor patient's objective and subjective responses to respiratory care; independently modify therapeutic procedures based on the patient's response; recommend modifications in the respiratory care plan based on the patient's response; determine the appropriateness of the prescribed respiratory care plan; recommend modifications; initiate, conduct, or modify respiratory care techniques in an emergency setting; act as an assistant to the physician performing special procedures; and initiate and conduct pulmonary rehabilitation and home care within the prescription.

Related Academic Standards

- R1 Interpret Graphic Information (forms, maps, reference sources)
- R2 Words in Context (same and opposite meaning)
- R3 Recall Information (details, sequence)
- R4 Construct Meaning (main idea, summary/paraphrase, compare/contrast, cause-effect)
- R5 Evaluate/Extend Meaning (fact/opinion, predict outcomes, point of view)
- M1 Addition of Whole Numbers (no regrouping, regrouping)
- M2 Subtraction of Whole Numbers (no regrouping, regrouping)
- M3 Multiplication of Whole Numbers (no regrouping, regrouping)
- M4 Division of Whole Numbers (no remainder, remainder)
- M5 Decimals (addition, subtraction, multiplication, division)
- M6 Fractions (addition, subtraction, multiplication, division)
- M7 Integers (addition, subtraction, multiplication, division)
- M8 Percents
- M9 Algebraic Operations
- A1 Numeration (ordering, place value, scientific notation)
- A2 Number Theory (ratio, proportion)
- A3 Data Interpretation (graph, table, chart, diagram)
- A4 Pre-Algebra and Algebra (equations, inequality)
- A5 Measurement (money, time, temperature, length, area, volume)
- A6 Geometry (angles, Pythagorean theory)
- A7 Computation in Context (whole numbers, decimals, fractions, algebraic operations)
- A8 Estimation (rounding, estimation)
- L1 Usage (pronoun, tense, subject-verb agreement, adjective, adverb)
- L2 Sentence Formation (fragments, run-on, clarity)
- L3 Paragraph Development (topic sentence, supporting sentence, sequence)
- L4 Capitalization (proper noun, titles)
- L5 Punctuation (comma, semicolon)
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Course Name: Cardiopulmonary Anatomy and Physiology

Course Abbreviation: RCT 1313

Classification: Vocational–Technical Core

Description: This course is a study of cardiopulmonary physiology in relation to the practice of respiratory care. (3sch: 3-hr lecture)

Pre/Corequisites: Anatomy and Physiology I (BIO 1514 or BIO 2514) and Anatomy and Physiology II (BIO 1524 or BIO 2524)

Competencies and Suggested Objectives	
1.	Explain the anatomy of the respiratory system. <ol style="list-style-type: none"> Explain the structures that comprise the upper airway. Explain the structures that comprise the lower airway. Explain the primary functions of the upper airway. Define the functional unit of the lung. Define internal and external respiration. Describe the mechanics of ventilation. Describe the structures and functions of the external lung and thorax.
2.	Describe the physiology of the respiratory system. <ol style="list-style-type: none"> Describe oxygen transport. Describe carbon dioxide transport. Explain acid base balance. Describe neurological control of ventilation. Describe the role of the renal system in relation to the cardiopulmonary system.
3.	Describe the anatomy and physiology of the cardiovascular system. <ol style="list-style-type: none"> Identify the structures and functions of the heart. Describe the major components of the blood. Identify the structures and functions of the major blood vessels. Explain the major cardiovascular disorders.

STANDARDS

Standards and Guidelines for Respiratory Programs

NBI Patient Data Evaluation and Recommendations: review existing data in the patient record; collect and evaluate additional pertinent clinical information; and recommend procedures to obtain additional data.

Related Academic Standards

R1 Interpret Graphic Information (forms, maps, reference sources)
 R2 Words in Context (same and opposite meaning)

- R3 Recall Information (details, sequence)
- R4 Construct Meaning (main idea, summary/paraphrase, compare/contrast, cause–effect)
- R5 Evaluate/Extend Meaning (fact/opinion, predict outcomes, point of view)
- M1 Addition of Whole Numbers (no regrouping, regrouping)
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- M3 Multiplication of Whole Numbers (no regrouping, regrouping)
- M4 Division of Whole Numbers (no remainder, remainder)
- M5 Decimals (addition, subtraction, multiplication, division)
- M6 Fractions (addition, subtraction, multiplication, division)
- M7 Integers (addition, subtraction, multiplication, division)
- M8 Percents
- M9 Algebraic Operations
- A1 Numeration (ordering, place value, scientific notation)
- A2 Number Theory (ratio, proportion)
- A3 Data Interpretation (graph, table, chart, diagram)
- A4 Pre-Algebra and Algebra (equations, inequality)
- A5 Measurement (money, time, temperature, length, area, volume)
- A6 Geometry (angles, Pythagorean theory)
- A7 Computation in Context (whole numbers, decimals, fractions, algebraic operations)
- A8 Estimation (rounding, estimation)
- L1 Usage (pronoun, tense, subject–verb agreement, adjective, adverb)
- L2 Sentence Formation (fragments, run-on, clarity)
- L3 Paragraph Development (topic sentence, supporting sentence, sequence)
- L4 Capitalization (proper noun, titles)
- L5 Punctuation (comma, semicolon)
- L6 Writing Conventions (quotation marks, apostrophe, parts of a letter)
- S1 Vowel (short, long)
- S2 Consonant (variant spelling, silent letter)
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21st Century Skills

- CS1 Global Awareness
- CS5 Thinking and Problem-Solving Skills
- CS6 Interpersonal and Self-Directional Skills

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Course Name: Pulmonary Function Testing (PFT)

Course Abbreviation: RCT 1322

Classification: Vocational–Technical Core

Description: This course is an introduction to pulmonary function technique and testing equipment. (2 sch: 1-hr lecture, 2-hr lab)

Pre/Corequisite: Cardiopulmonary Anatomy and Physiology (RCT 1313) or instructor approval

Competencies and Suggested Objectives	
1.	Assure infection control and equipment cleanliness.
2.	Determine the basis for the use of cardiopulmonary tests. <ol style="list-style-type: none"> Discuss the indications for pulmonary function testing. Demonstrate procedures for selected pulmonary function tests. Explain the significance of pulmonary function test findings. Discuss stress testing. Discuss apnea monitoring Discuss overnight pulse oximetry.
3.	Apply principles of pulmonary function tests. <ol style="list-style-type: none"> Describe the principles of operation of cardiopulmonary testing equipment. Describe the principles of operation of pulmonary function equipment.
4.	Recognize functions of blood gas and pulmonary function and other equipment utilized in cardiopulmonary testing. <ol style="list-style-type: none"> Maintain blood gas instrumentation, calibration, infection control, and quality assurance. Maintain pulmonary function equipment, calibration, infection control, quality assurance, and other cardiopulmonary monitoring equipment. Correct malfunctions of pulmonary function, blood gas, and other cardiopulmonary monitoring equipment.
5.	Discuss the relationship of disease processes to pulmonary function interpretations.

STANDARDS

Standards and Guidelines for Respiratory Programs

- NBI Patient Data Evaluation and Recommendations: review existing data in the patient record; collect and evaluate additional pertinent clinical information; and recommend procedures to obtain additional data.
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- NBIII Therapeutic procedure initiation and modification: maintain records and communicate information; maintain a patent airway including the care of artificial airways; remove bronchopulmonary secretions; achieve adequate respiratory support; evaluate and monitor patient's objective and subjective responses to respiratory care; independently

modify therapeutic procedures based on the patient's response; recommend modifications in the respiratory care plan based on the patient's response; determine the appropriateness of the prescribed respiratory care plan; recommend modifications; initiate, conduct, or modify respiratory care techniques in an emergency setting; act as an assistant to the physician performing special procedures; and initiate and conduct pulmonary rehabilitation and home care within the prescription.

Related Academic Standards

- R1 Interpret Graphic Information (forms, maps, reference sources)
- R2 Words in Context (same and opposite meaning)
- R3 Recall Information (details, sequence)
- R4 Construct Meaning (main idea, summary/paraphrase, compare/contrast, cause–effect)
- R5 Evaluate/Extend Meaning (fact/opinion, predict outcomes, point of view)
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- M7 Integers (addition, subtraction, multiplication, division)
- M8 Percents
- M9 Algebraic Operations
- A1 Numeration (ordering, place value, scientific notation)
- A2 Number Theory (ratio, proportion)
- A3 Data Interpretation (graph, table, chart, diagram)
- A4 Pre-Algebra and Algebra (equations, inequality)
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Course Name: Respiratory Care Technology I

Course Abbreviation: RCT 1416

Classification: Vocational–Technical Core

Description: This course is a study of respiratory treatments and equipment design and operation related to non-critical care procedures. (6 sch: 2 hr. lecture, 8 hr. lab)

Prerequisites: Anatomy and Physiology I (BIO 1514 or BIO 2514)

Competencies and Suggested Objectives	
1.	Apply principles of medical gas therapy to respiratory care. <ol style="list-style-type: none"> Describe the manufacture, transport, and storage of medical gases. Demonstrate the operation of medical gas controlling devices to include hyperbaric therapy. Select appropriate oxygen delivery devices. Explain the safety procedures, indications, and hazards of medical gas administration. Demonstrate the operation of various patient monitors and analyzers.
2.	Apply the principles of aerosol/humidity therapy to respiratory care. <ol style="list-style-type: none"> Define humidity and aerosol. Contrast a nebulizer and humidifier. State the factors that affect humidity output. Describe factors that affect aerosol penetration and deposition. Demonstrate the principles of operation, efficiency, and application of the various types of humidifiers and nebulizers. Explain the indicators and hazards of aerosol and humidity therapy.
3.	Apply principles of hyperinflation to respiratory care. <ol style="list-style-type: none"> Compare and contrast the major hyperinflation modalities. Compare and contrast the goals, indications, and adverse effects of hyperinflation devices. Describe the principles of operation of hyperinflation devices. Demonstrate the operation of hyperinflation devices.
4.	Apply principles of bronchopulmonary hygiene techniques. <ol style="list-style-type: none"> Identify the bronchopulmonary segments. Describe the positions required to drain designated lung segments. Describe the indications and hazards of bronchopulmonary hygiene techniques. Perform bronchopulmonary hygiene techniques to include coughing technique, autogenic drainage, positive expiratory pressure devise (PEP), intrapulmonary percussive ventilation (IPV), Flutter, and High Frequency Chest Wall Oscillation (HFCWO).
5.	Apply principles of airway care and manual resuscitation. <ol style="list-style-type: none"> Summarize the etiology of upper airway obstruction. Discuss the indications, hazards, and selection of artificial airways. Demonstrate the placement of artificial airways. Demonstrate techniques to monitor, and insure a safe and effective airway.

- e. Compare and contrast characteristics of various manual resuscitators.
- f. Demonstrate the use of various manual resuscitators.
- g. Apply principles of disease management.
 - (1) Monitor treatment outcomes.
 - (2) Initiate and modify therapy based on respiratory care protocol.

STANDARDS

Standards and Guidelines for Respiratory Programs

- NBI Patient Data Evaluation and Recommendations: review existing data in the patient record; collect and evaluate additional pertinent clinical information; and recommend procedures to obtain additional data.
- NBII Equipment Application and Cleanliness: select, assemble, use and troubleshoot equipment; ensure infection control; and perform quality control procedures.
- NBIII Therapeutic procedure initiation and modification: maintain records and communicate information; maintain a patent airway including the care of artificial airways; remove bronchopulmonary secretions; achieve adequate respiratory support; evaluate and monitor patient's objective and subjective responses to respiratory care; independently modify therapeutic procedures based on the patient's response; recommend modifications in the respiratory care plan based on the patient's response; determine the appropriateness of the prescribed respiratory care plan; recommend modifications; initiate, conduct, or modify respiratory care techniques in an emergency setting; act as an assistant to the physician performing special procedures; and initiate and conduct pulmonary rehabilitation and home care within the prescription.

Related Academic Standards

- R1 Interpret Graphic Information (forms, maps, reference sources)
- R2 Words in Context (same and opposite meaning)
- R3 Recall Information (details, sequence)
- R4 Construct Meaning (main idea, summary/paraphrase, compare/contrast, cause-effect)
- R5 Evaluate/Extend Meaning (fact/opinion, predict outcomes, point of view)
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- M9 Algebraic Operations
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- A4 Pre-Algebra and Algebra (equations, inequality)
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- A6 Geometry (angles, Pythagorean theory)
- A7 Computation in Context (whole numbers, decimals, fractions, algebraic operations)
- A8 Estimation (rounding, estimation)
- L1 Usage (pronoun, tense, subject–verb agreement, adjective, adverb)
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Course Name: Respiratory Care Technology II

Course Abbreviation: RCT 1424

Classification: Vocational–Technical Core

Description: This course is a continuation of Respiratory Care Practitioner. It is a study of the management of respiratory failure, including mechanical ventilation, pulmonary rehabilitation, and home care. (4 sch: 3-hr lecture, 2-hr lab)

Prerequisite: Respiratory Care Technology I (RCT 1416)

Competencies and Suggested Objectives	
1.	Apply concepts related to rehabilitation and home care. <ol style="list-style-type: none"> Discuss the goals and techniques of cardiopulmonary rehabilitation. Discuss the equipment and techniques of respiratory care in the home.
2.	Apply concepts related to mechanical ventilation. <ol style="list-style-type: none"> Classify mechanical ventilators. Discuss physiologic effects of mechanical ventilation. Discuss indications and hazards of mechanical ventilation. Demonstrate the setup, monitoring, modification, and discontinuation of mechanical ventilation. Demonstrate airway management in relation to mechanical ventilation.

STANDARDS

Standards and Guidelines for Respiratory Programs

NBI	Patient Data Evaluation and Recommendations: review existing data in the patient record; collect and evaluate additional pertinent clinical information; and recommend procedures to obtain additional data.
NBII	Equipment Application and Cleanliness: select, assemble, use and troubleshoot equipment; ensure infection control; and perform quality control procedures.
NBIII	Therapeutic procedure initiation and modification: maintain records and communicate information; maintain a patent airway including the care of artificial airways; remove bronchopulmonary secretions; achieve adequate respiratory support; evaluate and monitor patient's objective and subjective responses to respiratory care; independently modify therapeutic procedures based on the patient's response; recommend modifications in the respiratory care plan based on the patient's response; determine the appropriateness of the prescribed respiratory care plan; recommend modifications; initiate, conduct, or modify respiratory care techniques in an emergency setting; act as an assistant to the physician performing special procedures; and initiate and conduct pulmonary rehabilitation and home care within the prescription.

Related Academic Standards

- R1 Interpret Graphic Information (forms, maps, reference sources)
- R2 Words in Context (same and opposite meaning)
- R3 Recall Information (details, sequence)
- R4 Construct Meaning (main idea, summary/paraphrase, compare/contrast, cause–effect)
- R5 Evaluate/Extend Meaning (fact/opinion, predict outcomes, point of view)
- M1 Addition of Whole Numbers (no regrouping, regrouping)
- M2 Subtraction of Whole Numbers (no regrouping, regrouping)
- M3 Multiplication of Whole Numbers (no regrouping, regrouping)
- M4 Division of Whole Numbers (no remainder, remainder)
- M5 Decimals (addition, subtraction, multiplication, division)
- M6 Fractions (addition, subtraction, multiplication, division)
- M7 Integers (addition, subtraction, multiplication, division)
- M8 Percents
- M9 Algebraic Operations
- A1 Numeration (ordering, place value, scientific notation)
- A2 Number Theory (ratio, proportion)
- A3 Data Interpretation (graph, table, chart, diagram)
- A4 Pre-Algebra and Algebra (equations, inequality)
- A5 Measurement (money, time, temperature, length, area, volume)
- A6 Geometry (angles, Pythagorean theory)
- A7 Computation in Context (whole numbers, decimals, fractions, algebraic operations)
- A8 Estimation (rounding, estimation)
- L1 Usage (pronoun, tense, subject–verb agreement, adjective, adverb)
- L2 Sentence Formation (fragments, run-on, clarity)
- L3 Paragraph Development (topic sentence, supporting sentence, sequence)
- L4 Capitalization (proper noun, titles)
- L5 Punctuation (comma, semicolon)
- L6 Writing Conventions (quotation marks, apostrophe, parts of a letter)
- S1 Vowel (short, long)
- S2 Consonant (variant spelling, silent letter)
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21st Century Skills

- CS1 Global Awareness
- CS4 Information and Communication Skills
- CS5 Thinking and Problem-Solving Skills
- CS6 Interpersonal and Self-Directional Skills

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Course Name: Clinical Practice I

Course Abbreviation: RCT 1516

Classification: Vocational–Technical Core

Description: Patient assessment, performance of respiratory care procedures, and care plan formation are practiced in the hospital environment. A procedural guide is utilized to evaluate student competencies and performance of respiratory care procedures. (6 sch: 18-hr clinical)

Pre/Corequisites: Respiratory Care Science (RCT 1213), Patient Assessment and Planning (RCT 1223), Cardiopulmonary Anatomy and Physiology (RCT 1313), and Respiratory Care Technology I (RCT 1516)

Competencies and Suggested Objectives
<ol style="list-style-type: none"> 1. Evaluate patient data, and formulate a care plan. <ol style="list-style-type: none"> a. Review patient record data. b. Perform basic patient assessment. c. Evaluate pertinent clinical data. d. Recommend procedures to obtain additional data. e. Write a care plan for a given patient.
<ol style="list-style-type: none"> 2. Perform respiratory care procedures. <ol style="list-style-type: none"> a. Apply medical gas therapy concepts. b. Apply aerosol humidity therapy concepts. c. Perform hyperinflation techniques. d. Demonstrate cardiopulmonary resuscitation (CPR). e. Perform bronchopulmonary techniques. f. Perform basic airway management techniques. g. Perform drug administration. h. Apply methods of decontamination. i. Troubleshoot equipment. j. Demonstrate isolation techniques. k. Demonstrate quality control procedures. l. Communicate information of patient status to appropriate health-care team members. m. Explain planned therapy and goals to patients in understandable terms to achieve optimal therapeutic outcomes. n. Communicate results of therapy, and alter therapy per protocols. o. Demonstrate techniques in analysis and performance of arterial blood gases. p. Demonstrate techniques in performing electrocardiograms.

STANDARDS

Standards and Guidelines for Respiratory Programs

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- NBII Equipment Application and Cleanliness: select, assemble, use and troubleshoot equipment; ensure infection control; and perform quality control procedures.
- NBIII Therapeutic procedure initiation and modification: maintain records and communicate information; maintain a patent airway including the care of artificial airways; remove bronchopulmonary secretions; achieve adequate respiratory support; evaluate and monitor patient's objective and subjective responses to respiratory care; independently modify therapeutic procedures based on the patient's response; recommend modifications in the respiratory care plan based on the patient's response; determine the appropriateness of the prescribed respiratory care plan; recommend modifications; initiate, conduct, or modify respiratory care techniques in an emergency setting; act as an assistant to the physician performing special procedures; and initiate and conduct pulmonary rehabilitation and home care within the prescription.

Related Academic Standards

- R1 Interpret Graphic Information (forms, maps, reference sources)
- R2 Words in Context (same and opposite meaning)
- R3 Recall Information (details, sequence)
- R4 Construct Meaning (main idea, summary/paraphrase, compare/contrast, cause-effect)
- R5 Evaluate/Extend Meaning (fact/opinion, predict outcomes, point of view)
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- M8 Percents
- M9 Algebraic Operations
- A1 Numeration (ordering, place value, scientific notation)
- A2 Number Theory (ratio, proportion)
- A3 Data Interpretation (graph, table, chart, diagram)
- A4 Pre-Algebra and Algebra (equations, inequality)
- A5 Measurement (money, time, temperature, length, area, volume)
- A6 Geometry (angles, Pythagorean theory)
- A7 Computation in Context (whole numbers, decimals, fractions, algebraic operations)
- A8 Estimation (rounding, estimation)
- L1 Usage (pronoun, tense, subject-verb agreement, adjective, adverb)
- L2 Sentence Formation (fragments, run-on, clarity)

- L3 Paragraph Development (topic sentence, supporting sentence, sequence)
- L4 Capitalization (proper noun, titles)
- L5 Punctuation (comma, semicolon)
- L6 Writing Conventions (quotation marks, apostrophe, parts of a letter)
- S1 Vowel (short, long)
- S2 Consonant (variant spelling, silent letter)
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21st Century Skills

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Course Name: Clinical Practice II

Course Abbreviation: RCT 1524

Classification: Vocational–Technical Core

Description: In this course, students rotate through various respiratory care subspecialty areas for evaluation of competency and performance of respiratory care procedures. (4 sch: 12-hr clinical)

Prerequisites: Clinical Practice I (RCT 1516)

Competencies and Suggested Objectives	
1.	Perform various basic pulmonary functions tests (PFT). <ol style="list-style-type: none"> Demonstrate performance of basic procedures for selected PFT. Demonstrate knowledge of predicted normal values of PFT. Observe the regimens for various PFT studies. Demonstrate quality assurance in use of PFT. Describe exercise physiology and the role of stress testing. Demonstrate use of equipment used in pulmonary functions testing.
2.	Explain the role respiratory care plays in cardiopulmonary rehabilitation. <ol style="list-style-type: none"> Discuss the indications and contraindications. Assess and monitor the patient rehabilitation. Evaluate the issues involved in implementation of a rehabilitation program. Demonstrate patient education. Participate in the multidisciplinary approach to the rehabilitation patient.
3.	Demonstrate basic procedures related to invasive and noninvasive ventilation. <ol style="list-style-type: none"> Adjust ventilator settings as needed. Evaluate ventilatory flow, volume, and pressure waveforms. Apply computer technology to patient management such as ventilator waveform analysis, electronic charting, and patient care algorithms. Maintain records of results of therapy. Measure auto-PEEP. Participate in intra-hospital ventilator transport. Troubleshoot equipment as related to respiratory care.

STANDARDS

Standards and Guidelines for Respiratory Programs

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NBIII Therapeutic procedure initiation and modification: maintain records and communicate information; maintain a patent airway including the care of artificial airways; remove bronchopulmonary secretions; achieve adequate respiratory support; evaluate and monitor patient's objective and subjective responses to respiratory care; independently modify therapeutic procedures based on the patient's response; recommend modifications in the respiratory care plan based on the patient's response; determine the appropriateness of the prescribed respiratory care plan; recommend modifications; initiate, conduct, or modify respiratory care techniques in an emergency setting; act as an assistant to the physician performing special procedures; and initiate and conduct pulmonary rehabilitation and home care within the prescription.

Related Academic Standards

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- R2 Words in Context (same and opposite meaning)
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- M5 Decimals (addition, subtraction, multiplication, division)
- M6 Fractions (addition, subtraction, multiplication, division)
- M7 Integers (addition, subtraction, multiplication, division)
- M8 Percents
- M9 Algebraic Operations
- A1 Numeration (ordering, place value, scientific notation)
- A2 Number Theory (ratio, proportion)
- A3 Data Interpretation (graph, table, chart, diagram)
- A4 Pre-Algebra and Algebra (equations, inequality)
- A5 Measurement (money, time, temperature, length, area, volume)
- A6 Geometry (angles, Pythagorean theory)
- A7 Computation in Context (whole numbers, decimals, fractions, algebraic operations)
- A8 Estimation (rounding, estimation)
- L1 Usage (pronoun, tense, subject-verb agreement, adjective, adverb)
- L2 Sentence Formation (fragments, run-on, clarity)
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- L5 Punctuation (comma, semicolon)
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21st Century Skills

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Course Name: Respiratory Care Pharmacology

Course Abbreviation: RCT 1613

Classification: Vocational–Technical Core

Description: This course is designed to introduce the student to the pharmacology related to cardiopulmonary disorders. (3 sch: 3-hr lecture)

Pre/Corequisites: Respiratory Care Science (RCT 1214), Cardiopulmonary Anatomy and Physiology (RCT 1313), and Patient Assessment and Planning (RCT 1223)

Competencies and Suggested Objectives

1. Apply the principles of pharmacology to respiratory care.
 - a. Understand drug utilization related to drugs' names, indications, contraindications, reactions, and interactions, as well as responses to adverse effects.
 - b. Explain the routes of administration, discussing aerosol delivery methods, advantages, and disadvantages.
 - c. Describe pharmacokinetics of drugs to include absorption, distribution, metabolism, and elimination.
 - d. Describe the pharmacodynamics of drugs to include selectivity and specificity; agonists vs. antagonists; and, potency, toxicity, tolerance, and half life.
 - e. Discuss the use and administration of specific drug categories related to cardiopulmonary medicine including the following: bronchodilators; mucokinetic and surfactants; anti-inflammatories and anti-asthmatics; anti-infective agents; cardiac agents; blood pressure and anti-thrombotic agents; and neuromuscular, sedative, anesthetic, and analgesic agents.
2. Perform medication calculations for adult, pediatric, and neonatal patients.
 - a. Proportionately calculate drug dilution and equivalent dose.
 - b. Calculate strength of solutions in percentage and ratio forms.
 - c. Calculate weight to weight conversions.
 - d. Calculate volume and weight conversions.
 - e. Perform conversion of units of measurement within the metric system and between the metric and common household system of measurement (English System).
 - f. Modify dosages for age, weight, and body mass index.

STANDARDS

Standards and Guidelines for Respiratory Programs

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Related Academic Standards

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Course Name: Cardiopulmonary Pathology

Course Abbreviation: RCT 2333

Classification: Vocational–Technical Core

Description: This course is a study of cardiopulmonary pathophysiology. It includes etiology, clinical manifestations, diagnostics and treatment of various cardiopulmonary diseases incorporating clinical practice guidelines, and therapist driven protocols. Case studies and/or clinical simulations will be utilized to enforce learning and evaluate progress. (3 sch: 3-hr lecture)

Prerequisites: Cardiopulmonary Anatomy and Physiology (RCT 1313)

Competencies and Suggested Objectives	
1.	Explain the etiology, pathophysiology, and management plan for diseases or patient scenarios affecting the cardiopulmonary system. <ol style="list-style-type: none"> Discuss the pathophysiology of diseases. Enumerate patient and family counseling concerning smoking cessation and disease management education.
2.	Apply clinical practice guidelines and therapist driven protocols using Subjective Objective Assessment Plan (SOAP) principles. <ol style="list-style-type: none"> Review patient records, and recommend diagnostic procedures to obtain additional data. Evaluate additional pertinent clinical information. Interpret results of diagnostic procedures. Determine appropriateness of the patient’s care plan. Recommend modification of the patient’s care plan.
3.	Apply the principles of polysomnography as related to diagnostic testing, assessment, and treatment.

STANDARDS

Standards and Guidelines for Respiratory Programs

- NBI Patient Data Evaluation and Recommendations: review existing data in the patient record; collect and evaluate additional pertinent clinical information; and recommend procedures to obtain additional data.
- NBII Equipment Application and Cleanliness: select, assemble, use and troubleshoot equipment; ensure infection control; and perform quality control procedures.
- NBIII Therapeutic procedure initiation and modification: maintain records and communicate information; maintain a patent airway including the care of artificial airways; remove bronchopulmonary secretions; achieve adequate respiratory support; evaluate and monitor patient’s objective and subjective responses to respiratory care; independently modify therapeutic procedures based on the patient’s response; recommend modifications in the respiratory care plan based on the patient’s response; determine the

appropriateness of the prescribed respiratory care plan; recommend modifications; initiate, conduct, or modify respiratory care techniques in an emergency setting; act as an assistant to the physician performing special procedures; and initiate and conduct pulmonary rehabilitation and home care within the prescription.

Related Academic Standards

- R1 Interpret Graphic Information (forms, maps, reference sources)
- R2 Words in Context (same and opposite meaning)
- R3 Recall Information (details, sequence)
- R4 Construct Meaning (main idea, summary/paraphrase, compare/contrast, cause–effect)
- R5 Evaluate/Extend Meaning (fact/opinion, predict outcomes, point of view)
- M1 Addition of Whole Numbers (no regrouping, regrouping)
- M2 Subtraction of Whole Numbers (no regrouping, regrouping)
- M3 Multiplication of Whole Numbers (no regrouping, regrouping)
- M4 Division of Whole Numbers (no remainder, remainder)
- M5 Decimals (addition, subtraction, multiplication, division)
- M6 Fractions (addition, subtraction, multiplication, division)
- M7 Integers (addition, subtraction, multiplication, division)
- M8 Percents
- M9 Algebraic Operations
- A1 Numeration (ordering, place value, scientific notation)
- A2 Number Theory (ratio, proportion)
- A3 Data Interpretation (graph, table, chart, diagram)
- A4 Pre-Algebra and Algebra (equations, inequality)
- A5 Measurement (money, time, temperature, length, area, volume)
- A6 Geometry (angles, Pythagorean theory)
- A7 Computation in Context (whole numbers, decimals, fractions, algebraic operations)
- A8 Estimation (rounding, estimation)
- L1 Usage (pronoun, tense, subject–verb agreement, adjective, adverb)
- L2 Sentence Formation (fragments, run-on, clarity)
- L3 Paragraph Development (topic sentence, supporting sentence, sequence)
- L4 Capitalization (proper noun, titles)
- L5 Punctuation (comma, semicolon)
- L6 Writing Conventions (quotation marks, apostrophe, parts of a letter)
- S1 Vowel (short, long)
- S2 Consonant (variant spelling, silent letter)
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21st Century Skills

- CS1 Global Awareness
- CS2 Financial, Economic, and Business Literacy
- CS3 Civic Literacy

- CS4 Information and Communication Skills
- CS5 Thinking and Problem-Solving Skills
- CS6 Interpersonal and Self-Directional Skills

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Course Name: Respiratory Care Technology III

Course Abbreviation: RCT 2434

Classification: Vocational–Technical Core

Description: This course is an advanced study of respiratory care in the critical care setting. Topics include non-conventional modes of mechanical ventilation, hemodynamics, special procedures, and advanced cardiac life support. (4 sch: 3-hr lecture, 2-hr lab)

Prerequisites: Respiratory Care Technology II (RCT 1424)

Competencies and Suggested Objectives	
1.	Apply concepts of non-conventional mechanical ventilation. <ol style="list-style-type: none"> a. Recommend non-conventional modes of mechanical ventilation. b. Describe the use of non-conventional modes of mechanical ventilation. c. Monitor the use of non-conventional modes of mechanical ventilation. d. Monitor patient response to non-conventional modes of mechanical ventilation. e. Recommend modifications to non-conventional modes of mechanical ventilation.
2.	Apply concepts to hemodynamics. <ol style="list-style-type: none"> a. Recommend diagnostic procedures to obtain additional data. b. Evaluate additional pertinent clinical information. c. Interpret the results of diagnostic procedures. d. Recommend modification based on appropriateness of care plans. e. Describe assembly, initiation, monitoring, and troubleshooting of hemodynamic monitoring systems. f. Review chest X-rays to assure proper placement of central venous and/or pulmonary artery catheters. g. Demonstrate arterial line therapy to include insertion, sampling, and maintenance.
3.	Apply concepts related to special procedures. <ol style="list-style-type: none"> a. Explain special procedures as described by the National Board for Respiratory Care matrix. b. Recommend diagnostic procedures to obtain additional data. c. Evaluate additional pertinent clinical information. d. Assist the physician performing special procedures. e. Describe moderate conscious sedation. f. Describe assembly, initiation, monitoring, and troubleshooting of chest tube drainage systems.
4.	Apply concepts related to advanced cardiac life support. <ol style="list-style-type: none"> a. Recognize basic arrhythmias. b. Recognize stable vs. unstable arrhythmias. c. Implement the appropriate algorithm. d. Recommend the common cardiopulmonary life support drugs. e. Demonstrate operation of defibrillation equipment, including synchronized cardioversion. f. Demonstrate emergency airway care procedures, including LMA and Combitube

- insertion, maintenance, and troubleshooting.
- g. Describe assembly, initiation, monitoring, and troubleshooting of transcutaneous and transvenous pacemakers.

STANDARDS

Standards and Guidelines for Respiratory Programs

- NBI Patient Data Evaluation and Recommendations: review existing data in the patient record; collect and evaluate additional pertinent clinical information; and recommend procedures to obtain additional data.
- NBII Equipment Application and Cleanliness: select, assemble, use and troubleshoot equipment; ensure infection control; and perform quality control procedures.
- NBIII Therapeutic procedure initiation and modification: maintain records and communicate information; maintain a patent airway including the care of artificial airways; remove bronchopulmonary secretions; achieve adequate respiratory support; evaluate and monitor patient's objective and subjective responses to respiratory care; independently modify therapeutic procedures based on the patient's response; recommend modifications in the respiratory care plan based on the patient's response; determine the appropriateness of the prescribed respiratory care plan; recommend modifications; initiate, conduct, or modify respiratory care techniques in an emergency setting; act as an assistant to the physician performing special procedures; and initiate and conduct pulmonary rehabilitation and home care within the prescription.

Related Academic Standards

- R1 Interpret Graphic Information (forms, maps, reference sources)
- R2 Words in Context (same and opposite meaning)
- R3 Recall Information (details, sequence)
- R4 Construct Meaning (main idea, summary/paraphrase, compare/contrast, cause-effect)
- R5 Evaluate/Extend Meaning (fact/opinion, predict outcomes, point of view)
- M1 Addition of Whole Numbers (no regrouping, regrouping)
- M2 Subtraction of Whole Numbers (no regrouping, regrouping)
- M3 Multiplication of Whole Numbers (no regrouping, regrouping)
- M4 Division of Whole Numbers (no remainder, remainder)
- M5 Decimals (addition, subtraction, multiplication, division)
- M6 Fractions (addition, subtraction, multiplication, division)
- M7 Integers (addition, subtraction, multiplication, division)
- M8 Percents
- M9 Algebraic Operations
- A1 Numeration (ordering, place value, scientific notation)
- A2 Number Theory (ratio, proportion)
- A3 Data Interpretation (graph, table, chart, diagram)
- A4 Pre-Algebra and Algebra (equations, inequality)
- A5 Measurement (money, time, temperature, length, area, volume)

- A6 Geometry (angles, Pythagorean theory)
- A7 Computation in Context (whole numbers, decimals, fractions, algebraic operations)
- A8 Estimation (rounding, estimation)
- L1 Usage (pronoun, tense, subject–verb agreement, adjective, adverb)
- L2 Sentence Formation (fragments, run-on, clarity)
- L3 Paragraph Development (topic sentence, supporting sentence, sequence)
- L4 Capitalization (proper noun, titles)
- L5 Punctuation (comma, semicolon)
- L6 Writing Conventions (quotation marks, apostrophe, parts of a letter)
- S1 Vowel (short, long)
- S2 Consonant (variant spelling, silent letter)
- S3 Structural Unit (root, suffix)

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21st Century Skills

- CS1 Global Awareness
- CS2 Financial, Economic, and Business Literacy
- CS3 Civic Literacy
- CS4 Information and Communication Skills
- CS5 Thinking and Problem-Solving Skills
- CS6 Interpersonal and Self-Directional Skills

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Course Name: Clinical Practice III

Course Abbreviation: RCT 2534

Classification: Vocational–Technical Core

Description: In this course, students rotate through various clinical areas for evaluation of competency and performance of respiratory care procedures. (4 sch: 12-hr clinical)

Prerequisites: Clinical Practice II (RCT 1524)

Competencies and Suggested Objectives	
1.	Perform advanced diagnostic testing. <ol style="list-style-type: none"> a. Evaluate exercise physiology and stress testing.
2.	Perform advanced respiratory care procedures. <ol style="list-style-type: none"> a. Assist in special procedures related to respiratory therapy. b. Evaluate hemodynamic data. c. Expand on both conventional and non-conventional modes of mechanical ventilation. d. Observe special procedures related to respiratory therapy. e. Modify results of therapy, and recommend changes based on protocol(s). f. Evaluate arterial blood gases for modification of treatment as related to ventilator management.

STANDARDS

Standards and Guidelines for Respiratory Programs

- NBI** Patient Data Evaluation and Recommendations: review existing data in the patient record; collect and evaluate additional pertinent clinical information; and recommend procedures to obtain additional data.
- NBII** Equipment Application and Cleanliness: select, assemble, use and troubleshoot equipment; ensure infection control; and perform quality control procedures.
- NBIII** Therapeutic procedure initiation and modification: maintain records and communicate information; maintain a patent airway including the care of artificial airways; remove bronchopulmonary secretions; achieve adequate respiratory support; evaluate and monitor patient's objective and subjective responses to respiratory care; independently modify therapeutic procedures based on the patient's response; recommend modifications in the respiratory care plan based on the patient's response; determine the appropriateness of the prescribed respiratory care plan; recommend modifications; initiate, conduct, or modify respiratory care techniques in an emergency setting; act as an assistant to the physician performing special procedures; and initiate and conduct pulmonary rehabilitation and home care within the prescription.

Related Academic Standards

- R1 Interpret Graphic Information (forms, maps, reference sources)
- R2 Words in Context (same and opposite meaning)
- R3 Recall Information (details, sequence)
- R4 Construct Meaning (main idea, summary/paraphrase, compare/contrast, cause–effect)
- R5 Evaluate/Extend Meaning (fact/opinion, predict outcomes, point of view)
- M1 Addition of Whole Numbers (no regrouping, regrouping)
- M2 Subtraction of Whole Numbers (no regrouping, regrouping)
- M3 Multiplication of Whole Numbers (no regrouping, regrouping)
- M4 Division of Whole Numbers (no remainder, remainder)
- M5 Decimals (addition, subtraction, multiplication, division)
- M6 Fractions (addition, subtraction, multiplication, division)
- M7 Integers (addition, subtraction, multiplication, division)
- M8 Percents
- M9 Algebraic Operations
- A1 Numeration (ordering, place value, scientific notation)
- A2 Number Theory (ratio, proportion)
- A3 Data Interpretation (graph, table, chart, diagram)
- A4 Pre-Algebra and Algebra (equations, inequality)
- A5 Measurement (money, time, temperature, length, area, volume)
- A6 Geometry (angles, Pythagorean theory)
- A7 Computation in Context (whole numbers, decimals, fractions, algebraic operations)
- A8 Estimation (rounding, estimation)
- L1 Usage (pronoun, tense, subject–verb agreement, adjective, adverb)
- L2 Sentence Formation (fragments, run-on, clarity)
- L3 Paragraph Development (topic sentence, supporting sentence, sequence)
- L4 Capitalization (proper noun, titles)
- L5 Punctuation (comma, semicolon)
- L6 Writing Conventions (quotation marks, apostrophe, parts of a letter)
- S1 Vowel (short, long)
- S2 Consonant (variant spelling, silent letter)
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21st Century Skills

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Course Name: Clinical Practice IV

Course Abbreviation: RCT 2546

Classification: Vocational–Technical Core

Description: This course is a continuation of Clinical Practice III. In this course, students rotate through respiratory care areas. A procedural guide is utilized to evaluate student competency and performance. (6 sch: 18-hr clinical)

Prerequisites: Clinical Practice I (RCT 1516), Clinical Practice II (RCT 1524), and Clinical Practice III (RCT 2534)

Competencies and Suggested Objectives	
1.	Perform advanced respiratory care procedures independently. <ol style="list-style-type: none"> a. Analyze hemodynamic data. b. Perform selected conventional and non-conventional modes of mechanical ventilation. c. Perform critical care procedures. d. Evaluate ventilator graphics. e. Observe or assist in the performance of special procedures related to respiratory care. f. Assist in cardiopulmonary life support techniques.
2.	Perform neonatal/pediatric respiratory care procedures. <ol style="list-style-type: none"> a. Observe or assist in neonatal/pediatrics management. b. Observe or assist in neonatal/pediatric resuscitation techniques.
3.	Present a critical care case presentation. <ol style="list-style-type: none"> a. Collect patient data. b. Develop a care plan. c. Deliver an oral presentation.

STANDARDS

Standards and Guidelines for Respiratory Programs

- NBI Patient Data Evaluation and Recommendations: review existing data in the patient record; collect and evaluate additional pertinent clinical information; and recommend procedures to obtain additional data.
- NBII Equipment Application and Cleanliness: select, assemble, use and troubleshoot equipment; ensure infection control; and perform quality control procedures.
- NBIII Therapeutic procedure initiation and modification: maintain records and communicate information; maintain a patent airway including the care of artificial airways; remove bronchopulmonary secretions; achieve adequate respiratory support; evaluate and monitor patient's objective and subjective responses to respiratory care; independently modify therapeutic procedures based on the patient's response; recommend modifications in the respiratory care plan based on the patient's response; determine the appropriateness of the prescribed respiratory care plan; recommend modifications; initiate, conduct, or modify respiratory care techniques in an emergency setting; act as

an assistant to the physician performing special procedures; and initiate and conduct pulmonary rehabilitation and home care within the prescription.

Related Academic Standards

- R1 Interpret Graphic Information (forms, maps, reference sources)
- R2 Words in Context (same and opposite meaning)
- R3 Recall Information (details, sequence)
- R4 Construct Meaning (main idea, summary/paraphrase, compare/contrast, cause–effect)
- R5 Evaluate/Extend Meaning (fact/opinion, predict outcomes, point of view)
- M1 Addition of Whole Numbers (no regrouping, regrouping)
- M2 Subtraction of Whole Numbers (no regrouping, regrouping)
- M3 Multiplication of Whole Numbers (no regrouping, regrouping)
- M4 Division of Whole Numbers (no remainder, remainder)
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- M6 Fractions (addition, subtraction, multiplication, division)
- M7 Integers (addition, subtraction, multiplication, division)
- M8 Percents
- M9 Algebraic Operations
- A1 Numeration (ordering, place value, scientific notation)
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- A3 Data Interpretation (graph, table, chart, diagram)
- A4 Pre-Algebra and Algebra (equations, inequality)
- A5 Measurement (money, time, temperature, length, area, volume)
- A6 Geometry (angles, Pythagorean theory)
- A7 Computation in Context (whole numbers, decimals, fractions, algebraic operations)
- A8 Estimation (rounding, estimation)
- L1 Usage (pronoun, tense, subject–verb agreement, adjective, adverb)
- L2 Sentence Formation (fragments, run-on, clarity)
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- L5 Punctuation (comma, semicolon)
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21st Century Skills

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Course Name: Neonatal/Pediatrics Management

Course Abbreviation: RCT 2613

Classification: Vocational–Technical Core

Description: This course is a study of fetal development and the transition to extrauterine environment. It includes the most common cardiopulmonary disorders, neonatal and pediatric disease processes, and the modes of treatment. (3 sch: 3-hr lecture)

Pre/Corequisite: Respiratory Care Technology III (RCT 2434) and Clinical Practice IV (RCT 2546)

Competencies and Suggested Objectives
<ol style="list-style-type: none"> 1. Apply concepts related to neonatal management. <ol style="list-style-type: none"> a. Discuss the process of fetal lung development. b. Describe factors contributing to cardiopulmonary transition between fetal and neonatal life. c. Describe techniques of physical assessment of the neonate. d. Describe etiology, pathophysiology, clinical manifestations, diagnosis, and treatment of neonatal cardiopulmonary diseases. e. Discuss the indications, the hazards, and equipment related to the treatment of neonatal disorders. f. Discuss appropriate techniques of treatment of neonatal cardiopulmonary failure according to the Neonatal Resuscitation Program.
<ol style="list-style-type: none"> 2. Apply concepts related to pediatric management. <ol style="list-style-type: none"> a. Describe etiology, pathophysiology, clinical manifestations, diagnosis, and treatment of pediatric cardiopulmonary diseases. b. Discuss the indications, hazards, and equipment related to the treatment of pediatric disorders. c. Discuss appropriate techniques of treatment of pediatric cardiopulmonary failure according to PALS Resuscitation Guidelines. d. Discuss sedation and comfort techniques for pediatric patients as they apply to general floor and ICU care.

STANDARDS

Standards and Guidelines for Respiratory Programs

NBI Patient Data Evaluation and Recommendations: review existing data in the patient record; collect and evaluate additional pertinent clinical information; and recommend procedures to obtain additional data.

Related Academic Standards

- R1 Interpret Graphic Information (forms, maps, reference sources)
- R2 Words in Context (same and opposite meaning)
- R3 Recall Information (details, sequence)
- R4 Construct Meaning (main idea, summary/paraphrase, compare/contrast, cause–effect)
- R5 Evaluate/Extend Meaning (fact/opinion, predict outcomes, point of view)
- M1 Addition of Whole Numbers (no regrouping, regrouping)
- M2 Subtraction of Whole Numbers (no regrouping, regrouping)
- M3 Multiplication of Whole Numbers (no regrouping, regrouping)
- M4 Division of Whole Numbers (no remainder, remainder)
- M5 Decimals (addition, subtraction, multiplication, division)
- M6 Fractions (addition, subtraction, multiplication, division)
- M7 Integers (addition, subtraction, multiplication, division)
- M8 Percents
- M9 Algebraic Operations
- A1 Numeration (ordering, place value, scientific notation)
- A2 Number Theory (ratio, proportion)
- A3 Data Interpretation (graph, table, chart, diagram)
- A4 Pre-Algebra and Algebra (equations, inequality)
- A5 Measurement (money, time, temperature, length, area, volume)
- A6 Geometry (angles, Pythagorean theory)
- A7 Computation in Context (whole numbers, decimals, fractions, algebraic operations)
- A8 Estimation (rounding, estimation)
- L1 Usage (pronoun, tense, subject–verb agreement, adjective, adverb)
- L2 Sentence Formation (fragments, run-on, clarity)
- L3 Paragraph Development (topic sentence, supporting sentence, sequence)
- L4 Capitalization (proper noun, titles)
- L5 Punctuation (comma, semicolon)
- L6 Writing Conventions (quotation marks, apostrophe, parts of a letter)
- S1 Vowel (short, long)
- S2 Consonant (variant spelling, silent letter)
- S3 Structural Unit (root, suffix)

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21st Century Skills

- CS1 Global Awareness
- CS2 Financial, Economic, and Business Literacy
- CS3 Civic Literacy
- CS4 Information and Communication Skills
- CS5 Thinking and Problem-Solving Skills
- CS6 Interpersonal and Self-Directional Skills

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Course Name: Respiratory Care Seminar

Course Abbreviation: RCT 2713

Classification: Vocational–Technical Core

Description: This course is designed to integrate the essential elements of respiratory care practice through the use of care plans, case studies, and clinical simulations in a laboratory environment. Students develop an analytical approach to problem solving. Critical thinking is emphasized. (3 sch: 2-hr lecture, 2-hr lab)

Prerequisites: Respiratory Care Technology III (RCT 2434)

Competencies and Suggested Objectives	
1.	Review NBRC Detailed Content Outline for the Entry Level CRT Examination. <ol style="list-style-type: none"> a. Complete mock exams. b. Discuss NBRC exam content. c. Discuss test taking strategies. d. Discuss cognitive levels to include recall, application, and analysis.
2.	Review NBRC Detailed Content Outline for the Written RRT Examination. <ol style="list-style-type: none"> a. Complete mock exams. b. Discuss NBRC exam content. c. Discuss test taking strategies. d. Discuss cognitive levels to include recall, application, and analysis.
3.	Review NBRC Detailed Content Outline for the Clinical Simulation Examination. <ol style="list-style-type: none"> a. Complete mock exams. b. Discuss NBRC exam content. c. Discuss test taking strategies. d. Discuss cognitive levels to include recall, application, and analysis. e. Develop care plans. f. Develop case studies. g. Critique care plans. h. Prioritize patient care decisions. i. Judge patient response to therapy. j. Modify care plans as needed. k. Collect appropriate patient data. l. Analyze patient data.

STANDARDS

Standards and Guidelines for Respiratory Programs

NBI Patient Data Evaluation and Recommendations: review existing data in the patient record; collect and evaluate additional pertinent clinical information; and recommend procedures to obtain additional data.

- NBII Equipment Application and Cleanliness: select, assemble, use and troubleshoot equipment; ensure infection control; and perform quality control procedures.
- NBIII Therapeutic procedure initiation and modification: maintain records and communicate information; maintain a patent airway including the care of artificial airways; remove bronchopulmonary secretions; achieve adequate respiratory support; evaluate and monitor patient's objective and subjective responses to respiratory care; independently modify therapeutic procedures based on the patient's response; recommend modifications in the respiratory care plan based on the patient's response; determine the appropriateness of the prescribed respiratory care plan; recommend modifications; initiate, conduct, or modify respiratory care techniques in an emergency setting; act as an assistant to the physician performing special procedures; and initiate and conduct pulmonary rehabilitation and home care within the prescription.

Related Academic Standards

- R1 Interpret Graphic Information (forms, maps, reference sources)
- R2 Words in Context (same and opposite meaning)
- R3 Recall Information (details, sequence)
- R4 Construct Meaning (main idea, summary/paraphrase, compare/contrast, cause–effect)
- R5 Evaluate/Extend Meaning (fact/opinion, predict outcomes, point of view)
- M1 Addition of Whole Numbers (no regrouping, regrouping)
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- M3 Multiplication of Whole Numbers (no regrouping, regrouping)
- M4 Division of Whole Numbers (no remainder, remainder)
- M5 Decimals (addition, subtraction, multiplication, division)
- M6 Fractions (addition, subtraction, multiplication, division)
- M7 Integers (addition, subtraction, multiplication, division)
- M8 Percents
- M9 Algebraic Operations
- A1 Numeration (ordering, place value, scientific notation)
- A2 Number Theory (ratio, proportion)
- A3 Data Interpretation (graph, table, chart, diagram)
- A4 Pre-Algebra and Algebra (equations, inequality)
- A5 Measurement (money, time, temperature, length, area, volume)
- A6 Geometry (angles, Pythagorean theory)
- A7 Computation in Context (whole numbers, decimals, fractions, algebraic operations)
- A8 Estimation (rounding, estimation)
- L1 Usage (pronoun, tense, subject–verb agreement, adjective, adverb)
- L2 Sentence Formation (fragments, run-on, clarity)
- L3 Paragraph Development (topic sentence, supporting sentence, sequence)
- L4 Capitalization (proper noun, titles)
- L5 Punctuation (comma, semicolon)
- L6 Writing Conventions (quotation marks, apostrophe, parts of a letter)
- S1 Vowel (short, long)
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21st Century Skills

- CS1 Global Awareness
- CS2 Financial, Economic, and Business Literacy
- CS3 Civic Literacy
- CS4 Information and Communication Skills
- CS5 Thinking and Problem-Solving Skills
- CS6 Interpersonal and Self-Directional Skills

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Recommended Tools and Equipment

CAPITALIZED ITEMS

1. Air compressor, 10–20 PSIG (1 per program)
2. Air compressor, high pressure (50 PSIG) (1 per program)
3. Airways, adult tracheostomy care simulator (2 per program)
4. Airways, fiber optic intubation laryngoscope (1 per 5 students)
5. IV practice arm (1 per program)
6. Analogs, adult, mechanical test lungs (1 per program)
7. Analogs, infant, mechanical test lungs (1 per program)
8. Analytical equipment, assorted aneroid (1 per program)
9. Analytical equipment, spirometer (1 per program)
10. Analytical equipment, calibrated laboratory type (1 per program)
11. Bulk delivery system outlets (1 per 3 students)
12. Cardiac monitor with oscilloscope (1 per program)
13. Chest precursor (1 per 5 students)
14. Defibrillator, with monitor (teaching model)
15. Dryer, tube (1 per program)
16. Electrocardiograph, 12 channel (1 per program)
17. Hospital bed, electric (1–5 per program)
18. Humidifiers, ventilator (5 per program)
19. Manikins, adult arterial puncture arm (1 per 5 students)
20. Manikins, infant, arterial arm (1 per 5 students)
21. Manikins, infant intubation (1 per 5 students)
22. Manikins, adult intubation (1 per 5 students)
23. Manikin, ACLS advanced cardiac life support (1 per program)
24. Manikins, patient care with breath and heart sounds (1 per program)
25. Manikins, adult CPR (1 per 5 students)
26. Manikins, infant resuscitation (1 per 5 students)
27. Manikins, pediatric resuscitation (1 per 5 students)
28. Monitor, apnea (1 per program)
29. Nebulizers, aerosol, croup tent (1 per 10 students)
30. Nebulizers, aerosol, ultrasonic (1 per program)
31. Oscillator, high frequency chest wall (HFCWO) (1 per program)
32. Oxygen blender (1 per 10 students)
33. Oxygen concentrator (1 per program)
34. Oxygen Analyzer (1 per 4 students)
35. Analyzer, end tidal carbon dioxide (1 per program)
36. Analyzer, end tidal carbon monoxide (1 per program)
37. Pulse oximeter (2 per program)
38. Respirometer (1 per 5 students)
39. Suction source, piped vacuum (1 per program)
40. Suction source, portable (1 per program)
41. Therapy unit, interpulmonary percussive (1 per program)
42. Oxygen flow meter (20 per program)

43. Air flow meter (20 per program)
44. Ventilator, bi-pap unit with alarm (1 per program)
45. Ventilator, interpulmonary percussive
46. Ventilator, volume (1 per program)
47. Ventilator, neonatal mechanical (1 per 5 students)
48. Ventilator, microprocessor controlled with graphics (5 per program)
49. Ventilator, pressure cycled with stand (1 per 3 students)
50. Ventilator, neonatal, high frequency jet ventilator (1 per program)
51. Ventilator, neonatal, oscillator ventilator (1 per program)
52. Wheelchair, standard adult (1 per program)
53. Airway pressure disconnect alarm (1 per program)
54. X-ray view box, large (1 per program)
55. Pulmonary function machine, portable with spirometry and flow volume loop (1 per program)
56. Monitor, transcutaneous oxygen and carbon dioxide monitor (1 per program)
57. Portable liquid oxygen system (1 per program)
58. Computer w/CD ROM (1 per 2 students)
59. Model, anatomical, segmental lung (1 per 5 students)
60. Model, anatomical, skeleton (1 per program)
61. Model, anatomical, upper airway (1 per program)
62. Printer, with cable, to be network compatible (1 per 2 computers)
63. Computer carts on wheels (1 per each computer)
64. TV (1 per program)
65. VCR/DVD (1 per program)
66. Video camera, DVD (1 per program)
67. Destination presentation system (1 per program)
68. Data video projector (1 per program)
69. Smart board (1 per program)
70. Inhaled nitric oxide delivery system (1 per program)

NON-CAPITALIZED ITEMS

1. Airway, laryngeal mask (1 per program)
2. Blankets (bed) (1 per bed)
3. Blood pressure monitors (1 per 2 students)
4. Pillows (2 per bed)
5. Sheets (3 per bed)
6. Nebulizers, aerosol, all purpose (1 per 5 students)
7. Flutter (1 per 5 students)
8. PEP - Positive Expiratory Pressure device (1 per program)
9. Suction regulator (1 per 5 students)
10. Airways, double lumen (1 per program)
11. Airways, esophageal, tracheal Combitube ETC (1 per program)
12. Airways, assorted sizes and types
13. Airways, cuff pressure manometer (1 per 5 students)
14. Airways, negative inspiratory force meter (1 per 5 students)

15. Analogs, simple test lungs (1 per student)
16. Analytical equipment, calibrated super syringe (1 per program)
17. Analytical equipment, PCO₂ electrode (1 per program)
18. Analytical equipment, PH electrode (1 per program)
19. Analytical equipment, PO₂ electrode (1 per program)
20. Analytical equipment, stopwatches, fast sweep (1 per program)
21. Cart, E cylinder (3 per program)
22. Cart, H cylinder (1 per program)
23. Gauges, bourdon (1 per 5 students)
24. Generator, Downs Flow (1 per program)
25. High pressure delivery tubing (10 air and 10 oxygen per program)
26. Humidifiers, heaters (5 per program)
27. Humidifiers, heaters (wrap-around) (2 per program)
28. Kinetic flow tubes (1 per program)
29. Model, anatomical, heart (1 per 10 students)
30. Resuscitator, adult self inflating (1 per 5 students)
31. Resuscitator, gas powered (1 per program)
32. Resuscitator, pediatric (1 per 5 students)
33. Resuscitator, neonatal (1 per 5 students)
34. Stethoscope, Doppler (1 per program)
35. Thermometer, electronic, tympanic (1 per program)

RECOMMENDED INSTRUCTIONAL AIDS

It is recommended that instructors have access to the following items:

1. Cart, AV (2 per program)
2. Tool kit (1 per program)
3. Video screen (1 per program)
4. TV (1 per program)
5. VCR/DVD (1 per program)
6. Video camera, DVD (1 per program)
7. Destination presentation system (1 per program)
8. Data video projector (1 per program)
9. Smart board (1 per program)

Appendix A: Standards and Guidelines for Respiratory Care Technology Programs¹

- NBI Patient Data Evaluation and Recommendations: review existing data in the patient record; collect and evaluate additional pertinent clinical information; and recommend procedures to obtain additional data.
- NBII Equipment Application and Cleanliness: select, assemble, use and troubleshoot equipment; ensure infection control; and perform quality control procedures.
- NBIII Therapeutic procedure initiation and modification: maintain records and communicate information; maintain a patent airway including the care of artificial airways; remove bronchopulmonary secretions; achieve adequate respiratory support; evaluate and monitor patient's objective and subjective responses to respiratory care; independently modify therapeutic procedures based on the patient's response; recommend modifications in the respiratory care plan based on the patient's response; determine the appropriateness of the prescribed respiratory care plan; recommend modifications; initiate, conduct, or modify respiratory care techniques in an emergency setting; act as an assistant to the physician performing special procedures; and initiate and conduct pulmonary rehabilitation and home care within the prescription.

¹National Board for Respiratory Care, Inc. (2008). Content outline for the registry examination for advanced respiratory therapists (RRT). In *National board for respiratory care: Candidate handbook and application* (pp. 20–30). Olathe, KS: Author.

Appendix B: Related Academic Standards²

Reading

- R1 Interpret Graphic Information (forms, maps, reference sources)
- R2 Words in Context (same and opposite meaning)
- R3 Recall Information (details, sequence)
- R4 Construct Meaning (main idea, summary/paraphrase, compare/contrast, cause–effect)
- R5 Evaluate/Extend Meaning (fact/opinion, predict outcomes, point of view)

Mathematics Computation

- M1 Addition of Whole Numbers (no regrouping, regrouping)
- M2 Subtraction of Whole Numbers (no regrouping, regrouping)
- M3 Multiplication of Whole Numbers (no regrouping, regrouping)
- M4 Division of Whole Numbers (no remainder, remainder)
- M5 Decimals (addition, subtraction, multiplication, division)
- M6 Fractions (addition, subtraction, multiplication, division)
- M7 Integers (addition, subtraction, multiplication, division)
- M8 Percents
- M9 Algebraic Operations

Applied Mathematics

- A1 Numeration (ordering, place value, scientific notation)
- A2 Number Theory (ratio, proportion)
- A3 Data Interpretation (graph, table, chart, diagram)
- A4 Pre-Algebra and Algebra (equations, inequality)
- A5 Measurement (money, time, temperature, length, area, volume)
- A6 Geometry (angles, Pythagorean theory)
- A7 Computation in Context (whole numbers, decimals, fractions, algebraic operations)
- A8 Estimation (rounding, estimation)

Language

- L1 Usage (pronoun, tense, subject–verb agreement, adjective, adverb)
- L2 Sentence Formation (fragments, run-on, clarity)
- L3 Paragraph Development (topic sentence, supporting sentence, sequence)
- L4 Capitalization (proper noun, titles)
- L5 Punctuation (comma, semicolon)
- L6 Writing Conventions (quotation marks, apostrophe, parts of a letter)

Spelling

- S1 Vowel (short, long)
- S2 Consonant (variant spelling, silent letter)
- S3 Structural Unit (root, suffix)

² CTB/McGraw-Hill LLC. (1994). *Tests of adult basic education, Forms 7 and 8*. Monterey, CA: Author. Reproduced with permission of CTB/McGraw-Hill LLC. TABE is a registered trademark of The McGraw-Hill Companies, Inc. Copyright © 1994 by CTB/McGraw-Hill LLC. Reproduction of this material is permitted for educational purposes only.

Appendix C: 21st Century Skills³

CS1 Global Awareness

- Using 21st century skills to understand and address global issues
- Learning from and working collaboratively with individuals representing diverse cultures, religions, and lifestyles in a spirit of mutual respect and open dialogue in personal, work, and community contexts
- Promoting the study of non-English language as a tool for understanding other nations and cultures

CS2 Financial, Economic, and Business Literacy

- Knowing how to make appropriate personal economic choices
- Understanding the role of the economy and the role of business in the economy
- Applying appropriate 21st century skills to function as a productive contributor within an organizational setting
- Integrating oneself within and adapting continually to our nation's evolving economic and business environment

CS3 Civic Literacy

- Being an informed citizen to participate effectively in government
- Exercising the rights and obligations of citizenship at local, state, national, and global levels
- Understanding the local and global implications of civic decisions
- Applying 21st century skills to make intelligent choices as a citizen

CS4 Information and Communication Skills

- Information and media literacy skills: Analyzing, accessing, managing, integrating, evaluating, and creating information in a variety of forms and media; understanding the role of media in society
- Communication skills: Understanding, managing, and creating effective oral, written, and multimedia communication in a variety of forms and contexts

CS5 Thinking and Problem-Solving Skills

- Critical thinking and systems thinking: Exercising sound reasoning in understanding and making complex choices, understanding the interconnections among systems
- Problem identification, formulation, and solution: Ability to frame, analyze, and solve problems
- Creativity and intellectual curiosity: Developing, implementing, and communicating new ideas to others, staying open and responsive to new and diverse perspectives

CS6 Interpersonal and Self-Directional Skills

- Interpersonal and collaborative skills: Demonstrating teamwork and leadership, adapting to varied roles and responsibilities, working productively with others, exercising empathy, and respecting diverse perspectives
- Self-direction: Monitoring one's own understanding and learning needs, locating appropriate resources, and transferring learning from one domain to another
- Accountability and adaptability: Exercising personal responsibility and flexibility in personal, workplace, and community contexts; setting and meeting high standards and goals for one's self and others; and tolerating ambiguity

³ *21st century skills*. (n.d.). Washington, DC: Partnership for 21st Century Skills.

- Social responsibility: Acting responsibly with the interests of the larger community in mind; demonstrating ethical behavior in personal, workplace, and community contexts