



Critical Care Monitoring (RSPT 2255)

Credit: 2 semester credit hour (1 hour lecture, 1 hour lab)

Prerequisite: RSPT 1201, RSPT 1113, RSPT 1207, RSPT 1461, RSPT 1325, RSPT 1329, RSPT 1331, RSPT 1335, RSPT 1360

Co-requisite: RSPT: 2314, RSPT 2319

Course Description

Advanced monitoring techniques used to assess a patient in the critical care setting.

Required Textbook and Materials

1. *Clinical Assessment in Respiratory Care* by Wilkins
 - a. ISBN number 978-0-323-10029-8
2. *Egan's Fundamentals of Respiratory Care* by Wilkins
 - a. ISBN number 978-0-323-03657-3
3. *Egan's Fundamentals of Respiratory Care Workbook* by Wilkins
 - a. ISBN number 978-0-323-05188-0
4. Package of #882 scantrons, #2 pencils, and flash drive.

Course Objectives

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

1. Describe cardiopulmonary symptoms
2. Interpret the medical history and the interview
3. Review and interpret Vital signs
4. Review and discuss fundamental s of physical examination.
5. Describe and interpret data from a neurological assessment
6. Identify and interpret clinical laboratory studies.
7. Review and interpret blood gases
8. Review and interpret pulmonary function studies data.
9. Describe clinical application of the chest radiograph.
10. Review and interpret electrocardiogram tracings.
11. Review and describe the assessment of the neonatal and the pediatric patient
12. Describe the assessment of the older patient.
13. Evaluate the respiratory monitoring in the intensive care unit

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14. Describe and evaluate the assessment of cardiac output
15. Describe and evaluate assessment of hemodynamic pressures
16. Describe flexible fiberoptic bronchoscopy
17. Perform and evaluate the nutritional assessment of patients with respiratory disease
18. Perform Documentation of patient assessment
19. Identify indications/complications and troubleshooting of chest tubes.

Course Outline

- A. The medical history and the interview
 1. Obtaining and recording a patient history.
 2. Factors that can influence communication between techniques.
 3. Nonverbal communication interviewing.
 4. Techniques for structuring the interview.
 5. Techniques used to facilitate conversational interviewing.
 6. Alternative sources available for the patient history
 7. The difference between objective and subjective data and the difference between signs and symptoms.
 8. A complete health history and the type of information found in each section of the history.
 - a. Reviewing the following parts of a patient's chart:
 1. Admission notes
 2. Physician orders
 3. Progress notes
 - b. A "DNR" label on the patient's chart.
- B. Review cardiopulmonary symptoms
 1. The causes and common characteristics of the following symptoms:
 - a. Cough
 - b. Sputum production
 - c. Hemoptysis
 - d. Dyspnea
 - e. Chest pain
 - f. Dizziness and fainting
 - g. Swelling of the ankles, fluid balance
 - h. Fever, chills, and night sweats
 - i. Headache, altered mental status, and personality changes
 - j. Snoring
 - k. Gastroesophageal reflux
- C. Review and interpret vital signs.
 1. The four classic vital signs

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2. Other bedside clinical findings including abnormal sensorium and level of pain.
 3. The normal values of the following vital signs and common causes of deviation from normal in the adult:
 - a. Pulse rate
 - b. Respiratory rate
 - c. Blood pressure
 - d. Body temperature
 4. Issues related to body temperature measurement:
 - a. Types of devices commonly used
 - b. Factors affecting the accuracy of devices
 - c. Common sites and temperature ranges of those sites for measurement
 5. Fever affecting the following:
 - a. Oxygen consumption and carbon dioxide production
 - b. Respiratory rate
 - c. Pulse
 6. Terms:
 - a. Fever
 - b. Tachycardia
 - c. Bradycardia
 - d. Bradypnea
 - e. Pulsus paradoxus
 - f. Pulsus alternans
 - g. Tachypnea
 - h. Systolic blood pressure
 - i. Diastolic blood pressure
 - j. Hypertension
- D. Review of fundamentals of physical examination.
1. Components of the physical examination.
 2. The history of present illness..
 3. Significance of the following during examination of the head and neck:
 - a. Nasal flaring
 - b. Cyanosis
 - c. Pursed-lip breathing
 - d. Diaphoresis
 - e. Changes in papillary size in response to light
 - f. Deviated tracheal position
 - j. Jugular venous distention
 4. Method for measuring jugular venous pressure and expected normal findings.
 5. The topographic position of the following:
 - a. Thoracic cage landmarks (suprasternal notch, sterna angle [angle of Louis], vertebral spinous process [C7 and T1])
 - b. Lung fissures (oblique [major] and horizontal [minor])

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- c. Tracheal bifurcation anteriorly and posteriorly
 - d. Right and left diaphragm anteriorly and posteriorly
 - e. Pectus excavatum
 - f. Kyphosis
 - g. Scoliosis
 - h. Kyphoscoliosis
 - i. Barrel chest
 - j. Flail chest
6. Define the following terms:
 - a. Apnea
 - b. Biot's breathing
 - c. Cheyne-Stokes breathing
 - d. Kussmaul's breathing
 - e. Apneustic
 - f. Paradoxical breathing
 - g. Asthmatic
 7. Breathing patterns associated with restrictive and obstructive lung disease.
 8. Accessory muscle usage, retractions and bulging.
 9. Define the following terms:
 - a. Abdominal paradox
 - b. Respiratory alternans
 - c. Peripheral cyanosis
 - d. Central cyanosis
 - e. Hoover's sign
 10. Peripheral versus central cyanosis.
 11. Increased and decreased tactile fremitus.
 12. Decreased thoracic expansion as assessed during chest palpation.
 13. Subcutaneous emphysema.
 14. Increased and decreased resonance during percussion of the lung.
 15. Basic parts of a stethoscope and their uses.
 16. Technique for auscultation of the lungs.
 17. Define the following terms used to describe lung sounds and the mechanisms responsible for producing the sounds:
 - a. Tracheal
 - b. Bronchovesicular
 - c. Vesicular (normal)
 - d. Diminished/absent
 - e. Harsh/bronchial
 18. Define the following terms used to describe abnormal (adventitious) lung sounds of the mechanisms responsible for producing the sounds:
 - a. Crackles (rales)
 - b. Wheezes
 - c. Stridor
 - d. Pleural friction rub
 19. Describe lung sounds

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20. Significance of the following auscultatory findings:
 - a. Monophonic wheeze
 - b. Polyphonic wheeze
 - c. Stridor
 - d. Late inspiratory crackles
 - e. Inspiratory and expiratory crackles
 - f. Pleural friction rub
 21. Bronchophony and its cause.
 22. The topographic location of the apex and base of the heart during examination of the precordium.
 23. Point of maximal impulse, its normal location, and the factors that may cause it to shift to the right or left.
 24. Auscultating sounds produced by the aortic, pulmonic, mitral, and tricuspid valves.
 25. the first (S₁), second (S₂), third (S₃), and fourth (S₄) heart sounds.
 26. A “gallop rhythm” and what it signifies.
 27. Increase or decrease of the intensity of the heart sounds.
 28. A loud P₂ heard during auscultation of the heart.
 29. Systolic and diastolic heart murmurs.
 30. The term “hepatomegaly” .
 31. The following terms and their significance during the examination of the extremities:
 - a. Digital clubbing
 - b. Cyanosis
 - c. Pedal edema
 - d. Capillary refill
 - e. Peripheral skin temperature
- E. Neurological assessment
1. Key terms related to neurologic assessment.
 2. Anatomy of the nervous system.
 3. Cortical function of the different lobes of the brain.
 4. Functions of the brainstem, the cerebellum, and 12 pairs of cranial nerves.
 5. Techniques used to assess the mental status.
 6. Glasgow Coma Scale.
 7. Assessing sedation and delirium in the intensive care unit.
 8. Assess the cranial nerves, the sensory system, the motor system, coordination, and gait.
 9. Assess deep, superficial, and brainstem reflexes.
 10. Relationship between vital signs and neurologic status.
 11. Intracranial pressure monitoring and assessing cerebral perfusion pressure.
- F. Review of clinical laboratory studies.
1. The formed elements and plasma of the blood.
 2. Characteristics of blood serum and how it is obtained.
 3. Normal values of the following hematology laboratory tests:
 - a. White blood cell count

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- b. White cell differential
 - c. Red blood cell count
 - d. Hematocrit
 - e. Hemoglobin
 - f. Erythrocyte indices (mean cell volume, mean cell hemoglobin, mean cell hemoglobin concentration)
 - g. Reticulocyte count
 - h. Sedimentation rate
 - i. Platelet count
 - j. Coagulation studies (bleeding time, activated partial thromboplastin time, prothrombin time)
4. *Leukocytosis* and *leukopenia*.
5. The following white cell abnormalities:
- a. Neutrophilia
 - b. Neutropenia
 - c. Eosinophilia
 - d. Lymphocytosis
 - e. Lymphocytopenia
 - f. Monocytosis
6. The effect that AIDS and AIDS-related complex have on the ratio of T-helper to T-suppressor cells.
7. Leukemia and myeloproliferative disorders.
8. Left shift in terms of the white blood cell differential .
9. *Anemia* the most common causes of anemia.
10. Effect anemia has on oxygen-carrying capacity and tissue oxygenation.
11. Primary, secondary, and relative polycythemia.
12. Reduced platelet count.
13. Normal values of significance of abnormalities for each of the following chemistry laboratory tests:
- a. Electrolytes
 - b. Anion gap
 - c. Sweat electrolyte concentration
 - d. Blood urea nitrogen and creatinine
 - e. Enzymes (aspartate aminotransferase, alanine aminotransferase, alkaline phosphatase, acid phosphatase, lactic dehydrogenase, creatine kinase, amylase, lipase)
 - e. Glucose
 - f. Protein (immunoglobulin's, albumin)
 - g. Lipids (triglycerides, cholesterol, high-density and low-density lipoproteins)
14. Therapeutic level for theophylline
15. Medical microbiology terms:
- a. Normal flora
 - b. Gram stain
 - c. Culture
 - d. Sensitivity

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15. Ziehl-Neelsen stain.
 16. Methods for obtaining a fresh and uncontaminated sputum sample.
 17. The macroscopic (gross) sputum examination.
 - a. Appearance of the sputum from a patient with bronchiectasis.
 - b. The microscopic criteria used to determine whether a sputum sample is reliable.
 - c. Sputum eosinophilia.
 18. Organisms responsible for producing pneumonia and the most common cause of bacterial pneumonia.
 19. Indications and method of performing a bronchoalveolar lavage.
 20. Chest tube systems.
 21. The pleural fluid examination:
 - a. Increased pleural fluid amount
 - b. Milky pleural fluid
 - c. Hemorrhagic pleural fluid
 - d. Low protein content (less than 3 g/dl)
 - e. High protein content (more than 3 g/dl)
 - f. High pleural fluid lactic dehydrogenase
 22. Tests performed during urinalysis:
 - a. Specific gravity
 - b. pH
 - c. Protein content
 - d. Glucose content
 - e. Ketones
 - f. Bilirubin
 - g. Blood
 - h. Urobilinogen
 - i. Nitrates
 - j. Sedimentary constituents
 23. Histologic and cytologic examinations.
 24. Malignant tumors responsible for producing most primary lung cancers.
 25. Pulmonary samples that can be examined cytologically.
 26. Skin testing:
 - a. Diseases diagnosed
 - b. Procedures for testing
 - c. Anergy
 - d. Purified protein derivative
 - e. Cacilli Calmette-Guerin vaccine on purified protein derivative.
- G. Review and interpret blood gases
1. Arterial blood rather than venous blood is useful in determining the patient's respiratory status.
 2. Reviewing the laboratory data that reflect the patient's clotting ability before performing an arterial puncture.

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3. Common sites for arterial puncture.
4. Allen's test
5. Factors generally affect blood gas analysis:
 - a. Air bubbles in the syringe
 - b. Failing to put the sample on ice
 - c. heparin
6. Duration of arterial puncture site compression.
7. The normal values for the following blood gas parameters for a patient breathing room air at sea level:
 - a. pH
 - b. P_{aO_2}
 - c. P_{aCO_2}
 - d. HCO_3^-
 - e. S_{aO_2}
 - f. $P(A-a)_{O_2}$
 - g. C_{aO_2}
 - h. Base excess
 - i. P_{vO_2}
8. Indices of oxygenation:
 - a. P_{aO_2}
 - b. $P(A-a)_{O_2}$
 - c. S_{aO_2}
 - d. C_{aO_2}
 - e. P_{vO_2}
 - f. $C(a-v)_{O_2}$
 - g. HbCO
9. Hypoxia and hypoxemia.
 - a. General classifications of hypoxemia.
 - b. Mechanisms and most common physiologic cause of hypoxemia.
 - c. Increases and decreases in P_{aCO_2} , body temperature, and blood pH affect the oxyhemoglobin-dissociation curve and related S_{aO_2} measurements and oxyhemoglobin affinity.
 - d. Shifts in the oxyhemoglobin dissociation curve affecting oxygen transport at the tissues and lungs.
11. Factors that affect the following acid-base parameters:
 - a. pH
 - b. P_{aCO_2}
 - c. Plasma HCO_3^-
 - d. Standard HCO_3^-
 - e. Base excess
12. Henderson-Hasselbalch equation and the ratio of HCO_3^- to P_{aCO_2} needed to maintain a pH of 7.40.
13. Mixed acid-base abnormalities.
14. Expected compensation for each of the following simple acid-base disorders:
 - a. Respiratory acidosis
 - b. Respiratory alkalosis

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- c. Metabolic acidosis
 - d. Metabolic alkalosis
 - 15. Mixed acid-base disorders:
 - a. Metabolic and respiratory alkalosis
 - b. Metabolic and respiratory acidosis
 - 16. 95% confidence limit bands as used to assess acid- base status.
 - a. interpret the acid-base and oxygenation status of a patient.
- H. Review and interpret pulmonary function studies data.
- 1. Pulmonary function tests (PFTs).
 - 2. Situations in which PFTs are indicated.
 - 3. Define the following terms:
 - a. Spirometer
 - b. Spirograph
 - c. Spirogram
 - 4. Factors that affect PFT measurements:
 - a. Height and weight
 - b. Gender
 - c. Age
 - d. Patient effort
 - 5. Standard equipment found in a PFT laboratory and its basic uses.
 - 6. Abnormalities associated with obstructive and restrictive lung disease.
 - 7. The spirogram affected given a specific site of airway obstruction.
 - 8. Restrictive defect and the diseases that can cause restrictive patterns.
 - 9. Diseases that exhibit combined restrictive and obstructive defects.
 - 10. Approximate normal value, factors affecting, and significance of the following spirometric volumes and capacities:
 - a. Tidal volume (V_T)
 - b. Minute volume (VE)
 - c. Total lung capacity (TLC)
 - d. Vital capacity (VC) and slow VC (SVC)
 - e. Residual volume (RV)
 - f. Expiratory reserve volume (ERV)
 - g. Functional residual capacity (FRC)
 - h. Inspiratory reserve volume (IRV)
 - i. Inspiratory capacity (IC)
 - j. Maximal voluntary ventilation (MVV)
 - 11. The theory and methods used to measure RV and FRC employing the following techniques:
 - a. Body plethysmography
 - b. Open-circuit nitrogen washout
 - c. Closed-circuit helium dilution
 - 12. Approximate normal value, factors affecting, and significance of the following spirometric flow measurements:

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- a. Forced expiratory volume at 1 second (FEV_1) and FEV_1 /forced vital capacity (FVC)
 - b. Forced expiratory volume at 3 seconds (FEV_3) and FEV_3 /FVC
 - c. Peak expiratory flow (PEF)
 13. Patterns for obstructive and restrictive disease as seen on a flow volume loop.
 14. Before and after PFT bronchodilator assessment:
 - a. Purpose
 - b. Criteria for improvement
 - c. Validity in asthma versus other chronic obstructive pulmonary diseases
 15. The method of measurement, normal value, factors affecting, and significance of the following specialized pulmonary function studies:
 - a. Diffusion capacity (DL)
 - b. Airway resistance (R_{aw})
 - c. Compliance studies
 - d. Nitrogen washout
 - e. Respiratory quotient (RQ)
 - f. Bronchoprovocation testing
 16. Applications of the following exercise tests:
 - a. Stress electrocardiograph (ECG)
 - b. Ventilator capacity
 - c. Blood gases before and after exercise
 - d. Exercise challenge
 - e. Anaerobic threshold
 - f. Maximal oxygen uptake
 - g. 6 minute walk test
 17. Applications of pulmonary function testing:
 - a. Smoking cessation
 - b. Intensive care
 - c. Surgery
 - d. Sleep apnea
 - e. Environmental lung disease
 18. Interpretation of pulmonary function results in terms of obstructive, restrictive, or normal lung function.
- I. The chest radiograph.
1. How chest radiograph is produced.
 2. Radiolucent and radiopaque.
 3. Densities seen on the chest radiograph.
 4. The x-ray source and how the patient affects the images viewed on the radiograph.
 5. Standard distance between the x-ray source and film for a posteroanterior chest film.
 6. Indications for the use of a chest x-ray.

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7. Technique, indications, and advantages of the following chest radiographic views:
 - a. Posteroanterior
 - b. Left lateral
 - c. Anteroposterior
 - d. Lateral decubitus
 - e. Apical lordotic
 - f. Oblique
 - g. Expiratory
8. Position for endotracheal placement as seen on a chest x-ray.
9. Assessing a chest radiograph in the following situations:
 - a. Central nervous pressure line insertion
 - b. Pulmonary artery catheter placement
 - c. Nasogastric tube placement
 - d. Chest tube insertion
 - e. Thoracentesis
 - f. Pericardiocentesis
 - g. Bronchoscopy
10. Technique, indications, and advantages and disadvantages for computed tomography scanning.
11. Magnetic resonance imaging in lung disease.
12. Nuclear medicine lung scans.
13. The following problems affect lung scans:
 - a. Thromboembolism
 - b. Atelectasis
 - c. Pneumonia
 - d. Emphysema
14. Pulmonary angiography.
15. Assessing the following during technical evaluation of the chest x-ray:
 - a. Placement on view box
 - b. Adequacy of exposure
 - c. Patient rotation
 - d. Depth of inspiration
16. Technique for performing a systematic descriptive evaluation (interpretation) of the chest x-ray.
17. Special radiographic evaluation signs:
 - a. Silhouette sign
 - b. Air bronchogram
18. Limitations of the chest radiograph.
19. Chest radiographic findings for the following lung disorders:
 - a. Atelectasis
 - b. Pneumothorax
 - c. Hyperinflation
 - d. Interstitial lung disease
 - e. Congestive heart failure
 - f. Pleural effusion

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- g. Consolidation
 - h. Pneumonia
- J. Review and interpret electrocardiogram tracings.
- 1. Value of the electrocardiogram (ECG).
 - 2. Indication for the need for an ECG recording.
 - 3. The electrical conduction system of the heart and the role of each component.
 - 4. *Depolarization and repolarization.*
 - 5. Electrical activity of the heart associated with each wave and interval of the normal ECG.
 - 7. The ventricular rate and position for the PR interval and the QRS complex.
 - 8. Steps for ECG interpretation.
 - 9. ECG criteria for each of the following abnormalities:
 - a. Sinus bradycardia
 - b. Sinus tachycardia
 - c. Sinus dysrhythmia
 - d. Premature atrial contraction
 - e. Atrial flutter
 - f. Atrial fibrillation
 - g. Premature ventricular contractions
 - h. Ventricular tachycardia
 - i. Ventricular fibrillation
 - j. Asystole
 - k. First-, second-, and third-degree atrioventricular (AV) block
- I. Review the assessment of the neonatal and the pediatric patient
- 1. Information found in pregnancy, labor, and delivery .
 - 2. The Apgar scoring system and the five physical criteria:
 - a. heart rate
 - b. respiratory effort
 - c. muscle tone
 - d. reflex response
 - e. color
 - 3. Apgar scores that indicate:
 - a. normal status
 - b. moderate depression
 - c. severe depression of the newborn.
 - 4. Normal values for the vital signs in newborns and the clinical implications and abnormalities.
 - 5. Clinical implications of:
 - a. retractions
 - b. nasal flaring
 - c. grunting.

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6. The normal time for capillary refill and the clinical significance of poor capillary refill in the infant.
 7. Abdominal distention in the infant.
 8. Technique for auscultation of the infant.
 9. Clinical implications of abnormal breath sound in the infant.
 10. Causes of murmurs heard during auscultation of the infant precordium.
 11. Normal values for:
 - a. white blood cell
 - b. red blood cell count
 - c. partial differential for the infant
 1. at birth
 2. 7 days of age
 3. 14 days of age.
 12. Causes of abnormalities in the white blood cell and red blood cell counts in the infant.
 13. Clinical implications of abnormalities in:
 - a. blood glucose
 - b. total protein
 - c. albumin
 - d. serum enzymes
 - e. electrolytes.
 14. Normal values for arterial:
 - a. pH
 - b. P_{aO_2}
 - c. P_{aCO_2}
 - d. $H_aCO_3^-$,
 - e. base excess at:
 1. birth
 2. 24 hours after birth
 3. 2 days to 1 month
 4. and 1 month to 2 years after birth.
 15. blood gas parameters can lead to misleading results from the transcutaneous oxygen monitor.
 16. Lung volumes that can be measured in the newborn and the clinical value of such measurements.
 17. The need for a chest radiograph in the infant.
- J. Assessment of the older patient.
- a. Techniques for reducing communication barriers with older adult patients.
 - b. Loss of vision and hearing affect geriatric assessment efforts.
 - c. Techniques used to compensate for hearing or vision loss in patients.
 - d. Age-related structural and physiologic changes in the cardiovascular and pulmonary systems.
 - e. Older adults have a depressed immune system.
 - f. Pulmonary and cardiac assessment techniques.
 - g. Diagnostic tests that have altered age-related normal values.

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- h. Functional ability relates to level of health, both actual and perceived.

- K. Respiratory monitoring in the intensive care unit
 - a. Methods, normal values, and significance of measuring the following lung volumes in the intensive care unit:
 - 1. Tidal volume
 - 2. Rapid-shallow breathing index
 - 3. Vital capacity
 - 4. Functional residual capacity
 - b. Methods, normal values, and significance of measuring the following airway pressures or related indices in the intensive care unit:
 - 1. Peak pressure
 - 2. Plateau pressure
 - 3. Compliance
 - 4. Airway resistance
 - 5. Mean airway resistance
 - 6. Maximum airway resistance
 - c. Methods of detection and methods of minimizing auto-PEEP.
 - d. Monitoring pressure, volume and flow waveforms, and pressure volume curves in mechanically ventilated care unit.
 - e. Methods and significance of measuring the fraction of inspired oxygen and exhaled carbon dioxide in the intensive care unit.
 - f. Oxygen transport.
 - g. Clinical evaluation of oxygenation and their significance.
 - h. Evaluate tissue oxygen delivery and utilization:
 - 1. Oxygen delivery and availability
 - 2. Oxygen consumption
 - 3. Mixed venous oxygen tension
 - 4. Venous saturation
 - 5. Arterial to mixed venous oxygen content difference
 - 6. Oxygen extraction ratio
 - 7. Blood lactate
 - i. Value and limitations of pulse oximetry in monitoring oxygenation and oxygen delivery.
 - j. Techniques for monitoring tissue oxygenation and utilization.

- L. Assessment of cardiac output
 - a. Define the cardiac output, cardiac index, stroke volume, and venous return.
 - b. Regarding cardiac output:
 - 1. Method of calculation
 - 2. Range of normal values
 - 3. Effect of sympathetic nervous stimulation
 - c. Regarding the distribution of blood flow:
 - 1. Effect if metabolism and reduced oxygen availability on the regulation of blood flow through organs
 - 2. Percentage of total blood volume in venous system

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3. Effect of blood loss (hypovolemia) on circulatory function
 4. Basal distribution of blood flow to organs versus distribution during cardiac failure
 5. Effect of mechanical ventilation
 - d. Indicators of cardiac output:
 1. Cardiac index
 2. Ejection fraction
 3. Stroke volume
 4. End-diastolic volume
 5. Cardiac work
 6. Ventricular stroke work
 - e. Preload:
 1. Definition
 2. Values used to measure preload of the left and right ventricles
 3. Factors affecting
 4. Clinical value of ventricular function curves
 5. Effect of mechanical ventilation
 - f. Afterload:
 1. Definition
 2. Factors affecting
 3. Measurement
 4. Effect of vasodilators
 5. Calculation of systematic and pulmonary vascular resistance
 6. Effect of mechanical ventilation
 - g. Contractility:
 1. Definition
 2. Factors affecting
 3. Assessment
 - h. Technique for obtaining cardiac output via the following methods:
 1. Thermodilution
 2. Fick
 3. Pulse contour
 4. Doppler ultrasonic transducers
 - i. Noninvasive methods for evaluating cardiac performance:
 1. Transthoracic electrical transducers
 2. Echocardiography
 3. Radionuclide cardiac imaging
 4. Partial carbon dioxide breathing
- M. Assessment of hemodynamic pressures
- a. Arterial cannulation:
 1. Indications for placing an A line
 2. Catheter description and common insertion sites
 3. Procedure for placement of the catheter
 4. Interpretation of arterial pressure waveforms
 5. Pressures measured and their interpretation

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6. Potential complications
 - b. CVP monitoring:
 1. Indications for placing a CVP catheter
 2. Catheter description and insertion of the catheter
 3. Procedure for placement of the catheter
 4. Interpretation of the CVP waveform
 5. Interpretation of pressures measured
 6. Relationship of CVP to left and right ventricular function
 7. Potential complications
 - c. PA pressure monitoring:
 1. Indications for placing a PA catheter
 2. Catheter description and insertion sites
 3. Procedure for placement of the catheter
 4. Interpretation of PA waveforms
 5. Interpretation of pressure measured
 6. Relationship between PA diastolic pressure and PCWP
 7. Techniques for obtaining an accurate PCWP reading
 8. Relationship between transmural pressure and PCWP
 9. Effect of positive end-expiratory pressure on PCWP measurements
 10. Potential complications of using the PA catheter
- N. Nutritional assessment of patients with respiratory disease
- a. Nutrition and respiration are interrelated.
 - b. Functional importance of oxygen in nutrition.
 - c. Nutritional significance of measuring oxygen uptake.
 - d. Basal metabolic rate and basal energy expenditure.
 - e. Starvation affects the following:
 1. Body weight
 2. Muscle mass (diaphragm and other respiratory musculature)
 3. Forced vital capacity, forced expiratory volume in 1 second, and diffusing capacity of the lung for carbon dioxide
 4. Surfactant production
 - f. Respiratory treatment modalities may inhibit the nutritional status of patients.
 - g. By-products of anaerobic (without oxygen) metabolism.
 - h. Oxygen's importance in terms of adenosine triphosphate production.
 - i. Fat, carbohydrate, and protein metabolism affecting the respiratory quotient.
 - j. Daily nutritional requirements for:
 1. carbohydrate
 2. protein
 3. fat.

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- k. Protein requirements for normal and severely catabolic patients.
 - l. Measuring nitrogen balance.
 - m. Problems associated with a low-protein diet.
 - n. Advantages and disadvantages of a high-carbohydrate diet in regard to the pulmonary system.
 - o. Importance of vitamins and minerals in respiratory function.
 - p. Methods available for meeting nutritional requirements and their advantages and disadvantages.
 - q. Methods for assessing nutritional status.
 - r. Role of the respiratory therapist in nutritional assessment in relation to:
 - 1. inspection
 - 2. auscultation
 - 3. laboratory findings.
- O. Sleep-disordered breathing.
- a. Number of Americans affected by sleep disorders.
 - b. Assessment of patients with sleep-disordered breathing.
 - c. Correlation between:
 - 1. sleep apnea
 - 2. snoring
 - 3. excessive daytime sleepiness.
 - d. Epworth Sleepiness Scale and the Berlin Questionnaire surveys in assessing the presence of a sleep disorder.
 - e. Normal stages of sleep with associated physiologic changes in the cardiopulmonary system.
 - f. Assessment criteria for obstructive, central, and mixed sleep apnea.
 - g. Role of a polysomnogram in providing a differential diagnosis for sleep-disordered breathing.
 - h. Physiologic parameters monitored on a polysomnogram montage.
 - i. Criteria used to classify sleep apnea as:
 - 1. mild
 - 2. moderate
 - 3. severe.
 - j. Symptoms and assessment characteristics for children with sleep apnea.
- P. Review Documentation of patient assessment.
- a. Reasons why documentation is important.
 - b. Expectations for documentation in the patient's medical record required by The Joint Commission standards.
 - c. Definition of negligence.
 - d. Medical record documentation for respiratory therapists.
 - 1. Subjective
 - 2. objective

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Course Syllabi

3. assessment,
 4. plan method for documentation in the patient's medical record.
 - e. Medical record documentation
 1. Assessment
 2. plan
 3. implementation
 4. evaluation method
 5. problem
 6. intervention
 7. plan method for documentation of patient assessment data.
 - f. Medical record Documentation
 1. Situation
 2. background
 3. assessment
 4. recommendation format in patient assessment.
- Q. Chest tubes
- a. Pneumothorax and pleural effusions on chest x-ray
 - b. Equipment used in chest tube insertion and thoracentesis procedures
 - c. Chambers within a pleural evac system.
 - d. Function of the chambers within a pleural evac system
 - e. Complications associated with pleural evac systems

Grade Scale

93 – 100	A
85 – 92	B
77 – 84	C
68 – 76	D
0 – 67	F

Course Evaluation

Final grades will be calculated according to the following criteria:

- 1. 4 unit tests 80%**
- 2. Daily Quiz 20%**

Course Policies

Attendance – If you do not attend class you are missing some very valuable information. Test will include both textbook material and anything mentioned in class.

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Absences – According to LIT policy students with approved absences shall be allowed to make up examinations and written assignments without penalty. This privilege does not extend to unapproved absences. The determination of whether an absence is excused or approved is the responsibility of the instructor, except in the case of approved absence for an Institute-sponsored activity. If absences seriously interfere with performance the instructor may recommend to the Department Chair that the student be dropped from the course. You will be asked to present documentation to the instructor as to why the absence was necessary for the next class meeting that you attend, (i.e. doctor excuse, funeral pamphlet, note from child's doctor, etc.).

Make-up Exam - You may make-up an exam only if the absence is excused by the instructor. The make-up exam will be taken on the next class day that you return.

Class Roll – will be taken on the first and fourth class days. If your name is not on the class roster on the fourth class day, you will be asked to leave class until this matter is taken care of.

No eating, no drinking, turn off beepers, turn off cell phones, no disruptive behavior, and no children allowed in class please.

Remediation – Refer to Respiratory Care Student Handbook

Disabilities Statement

The Americans with Disabilities Act of 1992 and Section 504 of the Rehabilitation Act of 1973 are federal anti-discrimination statutes that provide comprehensive civil rights for persons with disabilities. Among other things, these statutes require that all students with documented disabilities be guaranteed a learning environment that provides for reasonable accommodations for their disabilities. If you believe you have a disability requiring an accommodation, please contact the Special Populations Coordinator at (409) 880-1737 or visit the office in Student Services, Cecil Beeson Building. You may also visit the online resource at <http://www.lit.edu/depts/stuserv/special/defaults.aspx>.

Student Code of Conduct Statement

It is the responsibility of all registered Lamar Institute of Technology students to access, read, understand and abide by all published policies, regulations, and procedures listed in the *LIT Catalog and Student Handbook*. The *LIT Catalog and Student Handbook* may be accessed at www.lit.edu or obtained in print upon request at the Student Services Office. Please note that the online version of the *LIT Catalog and Student Handbook* supersedes all other versions of the same document