



**LAMAR INSTITUTE
OF TECHNOLOGY**

RSPT 2255 Critical Care Monitoring

INSTRUCTOR CONTACT INFORMATION

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CREDIT

2 Semester Credit Hours (1 hours lecture, 2 hours lab)

MODE OF INSTRUCTION

Face to face

PREREQUISITE/CO-REQUISITE:

BIOL 2301, BIOL 2101, BIOL 2302, BIOL 2101, Math 1332, RSPT 1201, RSPT 1213

COURSE DESCRIPTION

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

COURSE OBJECTIVES

Upon completion of this course, the student will be able to

Describe cardiopulmonary symptoms

1. Interpret the medical history and the interview
2. Review and interpret Vital signs
3. Review and discuss fundamental s of physical examination.
4. Describe and interpret data from a neurological assessment
5. Identify and interpret clinical laboratory studies.
6. Review and interpret blood gases
7. Review and interpret pulmonary function studies data.
8. Describe clinical application of the chest radiograph.
9. Review and interpret electrocardiogram tracings.
10. Review and describe the assessment of the neonatal and the pediatric patient

11. Describe the assessment of the older patient.
12. Describe and evaluate the assessment of cardiac output
13. Describe and evaluate assessment of hemodynamic pressures
14. Describe flexible fiberoptic bronchoscopy
15. Perform and evaluate the nutritional assessment of patients with respiratory disease
16. 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
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])
 - 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
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 (S_1), second (S_2), third (S_3), and fourth (S_4) heart sounds.
26. A "gallop rhythm" and what it signifies.
27. Increase or decrease of the intensity of the heart sounds.
28. A loud P_2 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
 - 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,
 - d. 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
 16. Ziehl-Neelsen stain.
 17. Methods for obtaining a fresh and uncontaminated sputum sample.
 18. 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.
 19. Organisms responsible for producing pneumonia and the most common cause of bacterial pneumonia.
 20. Indications and method of performing a bronchoalveolar lavage.
 21. Chest tube systems.
 22. 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

23. 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

24. Histologic and cytologic examinations.

25. Malignant tumors responsible for producing most primary lung cancers.

26. Pulmonary samples that can be examined cytologically.

27. Skin testing:

- a. Diseases diagnosed
- b. Procedures for testing
- c. Anergy
- d. Purified protein derivative
- e. Bacilli 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.
- 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
 - 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:
- a. Forced expiratory volume at 1 second (FEV₁) and FEV₁/forced vital capacity (FVC)
 - b. Forced expiratory volume at 3 seconds (FEV₃) and FEV₃/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 (Raw)
 - 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.
- 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
 - 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.
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.
- 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 of metabolism and reduced oxygen availability on the regulation of blood flow through organs
 2. Percentage of total blood volume in venous system
 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
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.
- 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
 - 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

REQUIRED TEXTBOOK AND MATERIALS

1. *Clinical Assessment in Respiratory Care* by Wilkins 9th Edition

- a. ISBN number 978-0-323-69699-9

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.

ATTENDANCE POLICY

It is the student's responsibility to familiarize his or herself with the LIT Student Handbook and the Respiratory Care program student handbook.

Violation of the policies listed in the LIT Student Handbook and/or the Respiratory Care program student handbook will result in appropriate action being taken.

Attendance: Attendance is expected. Students are allowed 2 absences per semester, with or without a Dr.'s excuse. Each absence in excess of the 2 allotted absences will result in a 10% reduction, per absence, in the student's final class grade. Example: 3 absences = 10% reduction in final class grade, 4 absences = 20% reduction in final class grade, etc. Deductions as a result of excessive absences, will be applied to the student's final class grade at the end of the semester.

Your attendance is the biggest predictor of your success. If you do not attend class, you are missing very valuable information. Attendance will be recorded both in the classroom and in the lab. Absences in lab will result in a grade of 0 for that lab day. Tests will include both textbook material and material presented in class.

If absences seriously interfere with performance, the instructor may recommend, to the Department Chair, that the student be dropped from the course.

Absences resulting from extenuating circumstances will be evaluated by the program Director and/or Director of Clinical Education on a case by case basis. Proper documentation will be required to demonstrate the nature of the extenuating circumstance.

Examples of extenuating circumstances, and documentation, include:

- Hospitalization of an immediate family member (Hospital/Physician documentation must be provided)
- Death of an immediate family member (Memorial Pamphlet must be provided)

Tardiness: Punctuality is expected. 3 tardies in a semester will be considered as a 1 day absence.

You must notify the instructor via phone call, prior to missing an exam. Failure to notify instructor of an absence prior to the start of the exam will result a grade of 0 will be assigned for the missed exam. There will be no makeup exams or lab assignments if you fail to notify the instructor prior to a missed exam.

Make-Up Exams: Make up exams will be taken the first class day that the student returns following an absence. Make-up exams will be administered immediately at the beginning of the class on the day of return.

Homework Assignments: Homework assignments will be due immediately at the start of class. Late work (work turned in after the start of class) will not be accepted. If you are absent on the day a homework assignment is due, it is your responsibility to ensure that your work is emailed to the instructor prior to the start of class on the day of your absence.

Pop Quizzes: Pop Quizzes will be administered at the start of class. Any student who arrives tardy to class, after the Pop Quiz has been distributed, will receive a 0.

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, , no disruptive behavior, and no children allowed in class please.

Cellphone Policy

- Cell phones must be silenced or turned off during class time.
- Cell phones will be placed in the appointed cell phone pocket hanger.
- Attendance will be taken from the cell phone hanger with assigned names.
- Any cell phone use in class will result in your dismissal from class.
- If cell phones are used during an exam, you will be dismissed from the Respiratory Care Program.
- Computer usage not relating to course content is prohibited and will result in your dismissal from the Respiratory Care Program.

Remediation – Refer to Respiratory Care Student Handbook

DROP POLICY

If you wish to drop a course, you are responsible for initiating and completing the drop process by the specified drop date as listed on the [Academic Calendar](#). If you stop coming to class and fail to drop the course, you will earn an “F” in the course.

STUDENT EXPECTED TIME REQUIREMENT

For every hour in class (or unit of credit), students should expect to spend at least two to three hours per week studying and completing assignments. For a 3-credit-hour class, students should prepare to allocate approximately six to nine hours per week outside of class in a 16-week session OR approximately twelve to eighteen hours in an 8-week session. Online/Hybrid students should expect to spend at least as much time in this course as in the traditional, face-to-face class.

COURSE CALENDAR

DATE	TOPIC	READINGS (Due on this Date)	ASSIGNMENTS (Due on this Date)
Week 1	Preparing for the patient encounter The medical history	Chapter 1 and 2	Chapter 1 and 2
Week 2	Cardiopulmonary Symptoms Vital Signs Exam 1 (Ch 1-3)	Chapter 3 and 4	Chapter 3 and 4

Week 3	Fundamental of Physical Exam Neurological Assessment	Chapter 5 and 6	Chapter 5 and 6
Week 4	Exam 2 (4-6)		
Week 5	Clinical Lab Studies Interpretation of ABG	Chapter 7 and 8	Chapter 7 and 8
Week 6	PFT Clinical application of Chest X-Rays	Chapter 9 and 10	Chapter 9 and 10
Week 7	Interpretation of ECG's Exam 3 (7-11)	Chapter 11	Chapter 11
Week 8	Assessment of Neonatal and Pediatric patients	Chapter 12	Chapter 12
Week 9	Assessment of Older Adult Patients	Chapter 13	Chapter 13
Week 10	Respiratory Monitoring in ICU	Chapter 14	Chapter 14
Week 11	Assessment of Cardiac Output	Chapter 15	Chapter 15
Week 12	Assessment of Hemodynamic Pressures	Chapter 16	Chapter 16
Week 13	Exam 4 (12-16)		
Week 14	Flexible Fiberoptic Bronchoscopy	Chapter 17	Chapter 17
Week 15	Nutritional Assessment of pts with Respiratory Diseases Assessment of Sleep and Breathing Exam 5 (17-21)	Chapter 18, 19,21	Chapter 18,19,21
Week 16	Review		

COURSE EVALUATION

Final grades will be calculated according to the following criteria:

- 5-6 Unit Tests 80%
- Daily Quiz/Assignments 20%

GRADING SCALE

90 – 100	A
80- 89	B
77- 79	C
70-76	D
0 – 67	F

LIT does not use +/- grading scales

ACADEMIC DISHONESTY

Students found to be committing academic dishonesty (cheating, plagiarism, or collusion) may receive disciplinary action. Students need to familiarize themselves with the institution's Academic Dishonesty Policy available in the Student Catalog & Handbook at <http://catalog.lit.edu/content.php?catoid=3&navoid=80#academic-dishonesty>.

TECHNICAL REQUIREMENTS

The latest technical requirements, including hardware, compatible browsers, operating systems, etc. can be online at <https://lit.edu/online-learning/online-learning-minimum-computer-requirements>. A functional broadband internet connection, such as DSL, cable, or WiFi is necessary to maximize the use of online technology and resources.

DISABILITIES STATEMENT

The Americans with Disabilities Act of 1990 and Section 504 of the Rehabilitation Act of 1973 are federal anti-discrimination statutes that provide comprehensive civil rights for persons with disabilities. LIT provides reasonable accommodations as defined in the Rehabilitation Act of 1973, Section 504 and the Americans with Disabilities Act of 1990, to students with a diagnosed disability. The Special Populations Office is located in the Eagles' Nest Room 129 and helps foster a supportive and inclusive educational environment by maintaining partnerships with faculty and staff, as well as promoting awareness among all members of the Lamar Institute of Technology community. If you believe you have a disability requiring an accommodation, please contact the Special Populations Coordinator at (409)-951-5708 or email specialpopulations@lit.edu. You may also visit the online resource at [Special Populations - Lamar Institute of Technology \(lit.edu\)](#).

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. Please note that the online version of the *LIT Catalog and Student Handbook* supersedes all other versions of the same document.

Artificial Intelligence Statement

Lamar Institute of Technology (LIT) recognizes the recent advances in Artificial Intelligence (AI), such as ChatGPT, have changed the landscape of many career disciplines and will impact many students in and out of the classroom. To prepare students for their selected careers, LIT desires to guide students in the ethical use of these technologies and incorporate AI into classroom instruction and assignments appropriately. Appropriate use of these technologies is at the discretion of the instructor. Students are reminded that all submitted work must be their own original work unless otherwise specified. Students should contact their instructor with any questions as to the acceptable use of AI / ChatGPT in their courses.

STARFISH

LIT utilizes an early alert system called Starfish. Throughout the semester, you may receive emails from Starfish regarding your course grades, attendance, or academic performance. Faculty members record student attendance, raise flags and kudos to express concern or give praise, and you can make an appointment with faculty and staff all through the Starfish home page. You can also login to Blackboard or MyLIT and click on the Starfish link to view academic alerts and detailed information. It is the responsibility of the student to pay attention to these emails and information in Starfish and consider taking the recommended actions. Starfish is used to help you be a successful student at LIT.

ADDITIONAL COURSE POLICIES/INFORMATION

Late work will not be accepted.