RSPT 2420 COURSE OBJECTIVES

I. MODULE A – RESEARCH

A. SPECIFIC TOPICS COVERED

1. Research Databases
2. Types of Research
   a. Case Report
   b. Surveys
   c. Case-Control Studies
   d. Cohort Studies
   e. Randomized Control Studies
3. Format of Research Report
   a. Abstract
   b. Introduction
   c. Methods
   d. Results
   e. Discussion
4. Statistical Analysis

B. The student will be able to:

1. Identify one source where research on a topic can be conducted.
2. List two types of research presentations.
3. List the key components of a research paper.
4. List the key components of the methods section.
5. Identify two statistical measurements which can be used to evaluate outcomes.
6. Differentiate between internal and external validity.
7. Differentiate between the various levels of evidence.

II. MODULE B - HEMODYNAMIC MONITORING

A. SPECIFIC TOPICS COVERED:

1. Arterial Lines
2. CVP Catheters
3. Pulmonary Artery Catheters
4. Waveform Analysis
5. Intra-aortic Balloon Pump
6. Interpretation of Blood Pressures

B. The student will be able to:

1. Describe the features of a BTFDPA Catheter.
2. Discuss the insertion procedures and complications of the following:
   a. Arterial Catheters
   b. CVP Catheters
   c. Intra-aortic Balloon Pump
   d. BTFDPA Catheters
3. Identify the abbreviations and give the normal ranges for the following values:
   a. CVP
   b. RAP
   c. PAP
   d. BP (AP)
   e. MAP
   f. MPAP
   g. PCWP
4. Identify the abbreviations, calculate and evaluate results of the following values:
   a. CO
   b. CI
   c. PVR
   d. SVR
   e. CI
   f. EF
5. Calculate the following:
   a. CO using the Fick Equation
   b. Shunt
   c. CaO_2 - CvO2
6. List clinical conditions that increase or decrease the following values:
   a. CVP
   b. PAP
   c. PCWP
   d. CO
   e. SV
   f. PVR
   g. SVR
7. Given pressure tracings from the balloon tipped, flow-directed pulmonary artery catheter, identify the location of the catheter.
8. Describe the procedure used to obtain the PCWP.
9. List 3 ways to calculate the cardiac output.
10. List the formula for calculating stroke volume.

11. List the three determinants of stroke volume.
12. Define the following:
    a. Preload
    b. Afterload
    c. Pulse pressure
    d. Ejection fraction
13. Describe the technique for calculating cardiac output using the thermal dilution method.
14. Name the pressure measurement that reflects preload on the:
    a. Right side of the heart
    b. Left side of the heart
15. Name the pressure measurement that reflects afterload on the:
    a. Right side of the heart
    b. Left side of the heart
16. Describe how the BTFDPA catheter can be used to diagnosis a ventricular septal defect.
17. List the clinical signs and symptoms of right & left heart failure.
18. Describe appropriate treatment for Cor Pulmonale and Congestive Heart Failure.
19. List indications for intra-aortic balloon pumping and describe the function of the balloon pump.
20. List the 4 mechanisms causing pulmonary edema and give an example of each.
21. Define the term "damping" as it applies to the BTFDPA catheter.
22. Given hemodynamic values from a CVP, PA &/or arterial line catheter, analyze the results and recommend appropriate treatment.
23. Calculate oxygen consumption using the Fick Equation.
24. Describe the most accurate location to obtain true mixed venous oxygen.
25. Given abnormal venous blood gas values, evaluate the possible causes and recommend appropriate treatment.
26. Given a systolic and a diastolic blood pressure, calculate the mean blood pressure.
27. Describe the significance of the dicrotic notch on the pulmonary artery and blood pressure waveforms.
28. Define Starlings Law of the Heart.
29. Differentiate between the types of shock states and state the treatment for each.

III. MODULE C – POLYSOMNOGRAPHY

A. SPECIFIC ITEMS COVERED

1. Stages of Normal Sleep
2. Physiological Patterns of Normal Sleep
3. Neurotransmitters and Sleep
4. Assessment of Sleep Disorders
5. Obstructive Sleep Apnea
6. Central Sleep Apnea
7. Mixed Sleep Apnea
8. Polysomnography Equipment
9. Sleep Event Scoring
10. Sleep Apnea Management

B. The student will be able to:

1. List the stages of normal sleep.
2. Distinguish between the stages of normal sleep.
3. Given a neurotransmitter, state the effect it has on normal sleep.
4. List three factors assessed during a sleep history.
5. Differentiate between obstructive, central, and mixed sleep apnea.
6. State the treatment used for obstructive sleep apnea.
7. State the treatment used for central sleep apnea.
8. List four instruments used during polysomnography.
9. Describe the instrumentation used to assess nasal airflow.
10. Describe the instrumentation used to assess chest and abdominal wall movement.
11. Differentiate between an arousal and an awakening.
12. Differentiate between apnea and hypopnea.
13. Given appropriate data, calculate a Respiratory Disturbance Index.
14. Given a Respiratory Disturbance Index, state if the index is abnormal.
15. Describe rest leg syndrome.

IV. MODULE D - CHEST TUBE DRAINAGE SYSTEMS

A. SPECIFIC TOPICS COVERED

1. Chest Tube Insertion
2. Drainage Collection Devices
3. Troubleshooting Drainage Systems
4. Monitoring Chest Tubes

B. The student will be able to:

1. List the indications for chest tube drainage.
2. Describe the anatomic locations used for insertion of a chest tube for a:
   a. Pneumothorax
   b. Hemothorax
3. Differentiate between the capabilities of the following closed chest drainage systems:
   a. One bottle system
   b. Two bottle system
   c. Three bottle system
4. Describe the function and purpose of a water seal in a chest drainage system.
5. Given a picture of a one, two, or three bottle system and/or a disposable drainage unit, identify the following:
   a. Collection chamber
   b. Water seal
   c. Suction control chamber
6. Describe the effects of transpulmonary pressure changes on closed chest drainage in the following situations:
   a. During normal breathing
   b. During positive pressure ventilation
7. Describe how the suction control chamber controls suction to the pleural space.
8. Describe the significance of fluctuations in the water level in the water seal chamber.
9. Describe the significance of excessive bubbling in the water seal chamber.
10. Describe the procedure for removing a chest tube.
11. Identify and troubleshoot the following problems:
    a. Abnormal bubbling in the water seal.
    b. Collection of large amounts of fluid in the collection chamber.
    c. Too low of a water level in the suction-control bottle.
    d. Drainage bottle not in the proper position in relationship to the patient's chest excessive bubbling in the suction-control bottle.
    e. Absence of bubbling in the suction-control bottle.

V. MODULE E – INDIRECT CALORIMETRY

A. SPECIFIC TOPICS COVERED

1. Calorimetry and Indirect Calorimetry
2. Fuel Oxidation
3. Indirect Calorimetry Measurements
   a. Oxygen Measurement
   b. Carbon Dioxide Measurement
   c. Volume Measurement
4. Technical Considerations
5. Alterations in Measured Values
6. Metabolic Response to Stress
7. Interpretation of Data
   a. REE
   b. RQ
8. Malnutritition
9. Nutrient Replacement

B. The student will be able to:

1. Define the following terms:
   a. Calorimetry
   b. Indirect Calorimetry
   c. Joules
   d. Respiratory Exchange Ratio
   e. Respiratory Quotient
   f. Resting Energy Expenditure
2. List the components of an Indirect Calorimetry system.
3. Describe the effects on ventilation of the following food substrates:
   a. Carbohydrate
   b. Fat
   c. Protein
   d. State two sources of error in measurement of metabolic parameters during indirect calorimetry.

VI. **MODULE F – BRONCHOSCOPY**

A. **SPECIFIC TOPICS COVERED**

1. Indications
2. Contraindications
3. Hazards/Complications
4. Types of Bronchoscopes
5. Bronchoscopy Procedure
    a. Premedication
    b. Equipment Preparation
    c. Airway Preparation
    d. Monitoring

B. **The student will be able to:**

1. Define bronchoscopy.
2. List three indications for bronchoscopy.
3. Differentiate between the two types of bronchoscopes.
4. Describe the function of equipment typically found on a bronchoscopy cart.
5. State two contraindications to bronchoscopy.
6. State two complications of bronchoscopy and describe the Respiratory Therapist's role in assisting the physician in treatment of these complications.
7. State the four areas of intervention during a bronchoscopy.
8. List three common medications used in the preparation stage for a bronchoscopy.

VII. MODULE G - HOME CARE

A. SPECIFIC TOPICS COVERED

1. Developing a Patient Care Plan
2. Oxygen Delivery Devices for the Home
3. Oxygen Requirements
4. Patient Teaching
5. Ventilators used for Home Care

B. The student will be able to:

1. Describe the primary goals of homecare.
2. List treatment modalities that are part of the patient's home care plan.
3. State when the home care planning begins.
4. State who is responsible for beginning the home care plan.
5. List the components of a Respiratory Care prescription.
6. Describe criteria used to determine the frequency of a therapist visit.
7. Describe the evaluation process used in a home care plan.
8. Compare and contrast the types of oxygen systems prescribed for patients in the home care setting (gas cylinders, liquid systems, and oxygen concentrators).
9. Describe the oxygen delivery devices used for home care patients including oxygen-conserving devices.
10. List the indications for, precautions and/or possible complications of oxygen therapy in the home according to the AARC Clinical Practice Guidelines.
11. List the safety information given to a patient who will be using oxygen in the home.
12. Describe the function of an oxygen concentrator.
13. List the FiO_2 and liter flow capabilities of an oxygen concentrator.
14. Describe how FiO_2 is affected by changes in liter flow when using an oxygen concentrator.
15. List those items that should be checked on a monthly basis when performing a home visit for a patient receiving oxygen via an oxygen concentrator.
16. Describe the conditions necessary to maintain oxygen in a liquid state.
17. Given a volume of oxygen in the liquid state, calculate the amount available in the gaseous state.
18. Describe equipment used to deliver aerosol therapy in home care.
19. Explain when CPAP/BiPAP may be indicated for a patient in the home care setting.
20. Name the most common home care ventilators used and differentiate between ventilators used for home care and those used in the hospital setting.
21. List the equipment necessary to maintain a patient on a home care ventilator.
22. Describe the set-up and use of infant monitors in the home.
23. Describe the technique for cleaning of respiratory care equipment in the home.
24. Describe how to instruct a patient in pursed-lip, segmental and diaphragmatic breathing.
25. Describe the significance/benefit of pursed lip, segmental and diaphragmatic breathing.
26. Describe and recognize signs/symptoms that indicate pulmonary deterioration in home care patients.
27. Describe the psychological impact on long term, chronic illness on the patient and the family.

VIII. **MODULE H - MANAGEMENT**

A. **SPECIFIC ITEMS COVERED**

1. Resume Writing
2. Job Interview
3. Department Budgets
4. Chain of Command
5. Conflict Resolution
6. Absenteeism
7. Therapist Driven Protocols
8. Quality Control
9. Professional Behaviors

B. **The student will be able to:**

1. Explain the current trends used in writing a professional resume.
2. Differentiate between a capital budget and an operating budget and describe the key components of an operating budget.
3. Apply simple cost accounting principles as it relates to basic respiratory care procedures.
4. Describe the source of revenues within a Respiratory Care Department.
5. Describe at least three techniques aimed at conflict resolution.
6. Describe at least three positive and three negative personality traits and describe how to emphasize/de-emphasize these during an interview.
7. Identify the components of Continuous Quality Improvement.
8. Describe the benefits for implementing Therapist Driven Protocols in a RC department.
9. Discuss how absenteeism affects the entire RC department.
10. List professional behaviors that RC managers are looking for in potential applicants.
11. Describe the “chain of command” when dealing with a problem in a Respiratory Therapy department.

IX. MODULE I – PULMONARY REHABILITATION

A. SPECFIC TOPICS COVERED

1. Candidates for Pulmonary Rehabilitation
2. Components of a Pulmonary Rehabilitation Program
3. Evaluation of Dyspnea

B. The student will be able to:

1. Define Pulmonary Rehabilitation
2. List two disease states that have shown benefit from Pulmonary Rehabilitation
3. List three components of a Pulmonary Rehabilitation Program
4. List two scales to quantify dyspnea

X. MODULE J – ADVANCED VENTILATION STRATEGIES

A. SPECFIC TOPICS COVERED

1. Proportional Assist Ventilation
2. Biologically Variable Ventilation

B. The student will be able to:

1. Differentiate between Proportional Assist Ventilation (PAV), Pressure Control Ventilation (PCV), and Pressure Support Ventilation (PSV).
2. List three potential benefits of PAV over conventional ventilation.
3. State the Equation of Motion.
4. Describe how PAV uses the Equation of Motion to deliver a breath.
5. List the one clinician-set parameter used in PAV.
6. Describe how the Work of Breathing bar on the PB-840 ventilator can be used to set the % Support setting appropriately during PAV.
7. Describe Biologically Variable Ventilation.
8. Describe how Functional Residual Capacity can be measured during mechanical ventilation.

XI. MODULE K – ELECTROCARDIOGRAPHY

A. SPECIFIC TOPICS COVERED

1. Cardiovascular Anatomy
2. ECG Paper
3. Sinus Dysrhythmias
4. Atrial Dysrhythmias
5. Junctional Dysrhythmias
6. Ventricular Dysrhythmias
7. Heart Blocks
8. Myocardial Infarction
9. Axis Deviation

B. The student will be able to:

1. Define the following terms:
   a. Automaticity
   b. Aberrant conduction
   c. Absolute refractory period
   d. Relative refractory period
   e. Supraventricular tachycardia
   f. Idioventricular rhythm
   g. Nodal rhythm
   h. Junctional rhythm
   i. Sinus rhythm
   j. Fascicles
   k. Depolarization
   l. Depolarization
   m. AED - Automatic External Defibrillator
   n. AICD - Automatic Implantable Cardioverter-Defibrillator
   o. Escape mechanism
   p. Action potential
   q. Axis deviation
   r. Sudden Death
   s. Transmural
   t. Subendocardial
2. State the purpose of each of the following structures:
   a. Atria
   b. Interatrial septum
   c. Coronary sulcus
   d. Ventricle
   e. Interventricular septum
   f. Interventricular sulcus
   g. Endocardium
   h. Epicardium
   i. Myocardium
   j. Pericardium
   k. Atrioventricular valves
   l. Semilunar valves
   m. Sinoatrial node

n. Atrioventricular node
o. Bundle of His
p. Right and Left Bundle Branches
q. Purkinje Fibers

3. State the two causes of a murmur
4. List the three coronary arteries.
5. Given a coronary artery, state the areas of the myocardium it supplies blood to.
6. Given a coronary artery, state the areas of the conduction system it supplies blood to.
7. Differentiate between the terms dysrhythmia and arrhythmia.
8. Differentiate between the function of the two types of cardiac cells.
9. Name the three primary electrolytes involved with depolarization and repolarization.
10. Describe the electrolyte movement that exists during depolarization and repolarization of the heart.
11. Differentiate between slow and fast membrane channels.
12. Differentiate between absolute and relative refractory periods.
13. State the inherent firing rates of each of the following:
    a. Sinoatrial node
    b. A-V bundle
    c. Purkinje fibers
14. List the components of the cardiac conduction system in the correct functional order.
15. Differentiate between the four causes of dysrhythmias.
16. Differentiate between a lead and an electrode.
17. State how current moves between electrodes.
18. Given a positive and negative electrode, state which lead is being evaluated:
    a. Lead I
    b. Lead II
    c. Lead III
    d. Lead aVF
    e. Lead aVR
    f. Lead aVL
    g. Lead V_1
    h. Lead V_2
    i. Lead V_3
    j. Lead V_4
    k. Lead V_5
    l. Lead V_6
    m. MCL_1
    n. MCL_6
19. State the placement of electrodes on the body for ECG analysis.
20. Describe the modification in standard electrode placement to evaluate a right-sided ECG analysis.
21. Describe the modification in standard electrode placement to evaluate a posterior-view ECG analysis.
22. List three ways an error in electrode placement for ECG analysis can be identified.
23. State the duration of time of a small box on an ECG tracing.
24. State the duration of time of a large box on an ECG tracing.
25. Given an ECG tracing, determine the heart rate.
26. Given an ECG tracing, identify the P wave.
27. Given an ECG tracing, state the significance of a variation in P waves.

28. Given an ECG tracing, determine the PR interval.
29. State the normal value for a PR interval.
30. State the significance of a PR interval outside of the normal range.
31. Given an ECG tracing, determine the duration of the QRS complex.
32. State the normal value for the duration of the QRS complex.
33. State the significance of a prolonged duration of the QRS complex.
34. Describe how to determine if a Q wave is significant.
35. State the significance of a significant Q wave.
36. Given a QRS complex, identify it as one of the following:
    a. rS
    b. rSR'
    c. Rsr'
    d. RS
    e. qRs
    f. qR
    g. qrS
    h. QS
37. Given an ECG tracing, identify the ST segment.
38. Given an ECG tracing, identify the J point.
39. Given an ECG tracing, identify if the ST segment is abnormally positioned.
40. State the significance of ST segment depression.
41. State the significance of ST segment elevation.
42. Given an ECG tracing, identify the T wave.
43. State the normal height of a T wave in the standard limb leads.
44. State the normal height of a T wave in the precordial leads.
45. State the significance of a tall, peaked T wave.
46. State the significance of a flat or inverted T wave.
47. List three causes of artifact in an ECG tracing.
48. Given an ECG tracing, identify the cause of artifact as
    a. 60-cycle interference
    b. Loose electrode wires
    c. Muscle tremors
49. Given a 12-lead ECG, determine the axis deviation.
50. State the significance of a right-axis deviation.
51. State the significance of a left-axis deviation.
52. Given a 12-lead ECG, determine the stage of myocardial ischemia, injury, or infarction.
53. Given a 12-lead ECG, identify the location of myocardial ischemia, injury, or infarction.
    a. Lateral wall MI
    b. Inferior wall MI
    c. Inferolateral wall MI
    d. Septal wall MI
    e. Anterior wall MI
    f. Posterior wall MI
    g. Right ventricular MI
54. Differentiate between the following:
    a. Unstable angina
    b. Non-ST-Segment elevation (non-Q-wave) MI
    c. ST-Segment elevation (Q-wave) MI
55. State the WHO's criteria for diagnosis of an myocardial infarction.

56. Identify the risk factors of coronary artery disease.
57. List the symptoms of a myocardial infarction.
58. Describe the steps in the diagnosis of a myocardial infarction.
59. Describe the significance of abnormal enzyme studies in diagnosing a myocardial infarction.
60. Describe how an MI is treated according to ACLS protocol.
61. Given a 12-lead ECG, identify the location of each of the 12 leads.
62. State the significance of an abnormal R-wave progression.
63. State the significance of reciprocal changes.
64. Given a 12-lead ECG indicative of myocardial infarction, identify the reciprocal changes.
65. Given an ECG tracing of a bundle-branch block, differentiate between a right-bundle branch block and a left-bundle branch block.
66. Differentiate between cardioversion and defibrillation.
67. Differentiate between a monophasic and a biphasic defibrillator.
68. State the standard placement of defibrillation pads.
69. List the four steps in use of an AED.
70. State the proper sequence of events when a “No Shock Advised” message is delivered by an AED.
71. State the primary purpose of cardioversion.
72. State the purpose of an AICD.
73. List two indications for pacemakers.
74. Given an ECG tracing, identify the following rhythms:
    a. Normal Sinus Rhythm
    b. Sinus Bradycardia
    c. Sinus Tachycardia
    d. Premature Atrial Contractions
    e. Atrial Tachycardia
    f. Atrial Flutter
    g. Atrial Fibrillation
    h. Premature Junctional Contraction
    i. Junctional Escape Rhythm
    j. Accelerated Junctional Rhythm
    k. Junctional Tachycardia
    l. Premature Ventricular Contraction
        i. Couplet
        ii. Bigeminy
        iii. Trigeminy
        iv. Multi-formed
        v. R-on-T
    m. Ventricular Escape Rhythm
    n. Accelerated Idioventricular Rhythm
    o. Ventricular Tachycardia
    p. Polymorphic Ventricular Tachycardia
    q. Ventricular Fibrillation
    r. Asystole
    s. Pulseless Electrical Activity
    t. First-Degree Heart Block
    u. Second-Degree Heart Block Type I
    v. Second-Degree Heart Block Type II
    w. Complete (Third-Degree) Heart Block

x. Pacemaker Rhythm

75. Given the following ECG tracing, state the appropriate therapeutic intervention:
    a. Normal Sinus Rhythm
    b. Sinus Bradycardia
    c. Sinus Tachycardia
    d. Premature Atrial Contractions
    e. Atrial Tachycardia
    f. Atrial Flutter
    g. Atrial Fibrillation
    h. Premature Junctional Contraction
    i. Junctional Escape Rhythm
    j. Accelerated Junctional Rhythm
    k. Junctional Tachycardia
    l. Premature Ventricular Contraction
        i. Couplet
        ii. Bigeminy
        iii. Trigeminy
        iv. Multi-formed
        v. R-on-T
    m. Ventricular Escape Rhythm
    n. Accelerated Idioventricular Rhythm
    o. Ventricular Tachycardia
    p. Polymorphic Ventricular Tachycardia
    q. Ventricular Fibrillation
    r. Asystole
    s. Pulseless Electrical Activity
    t. First-Degree Heart Block
    u. Second-Degree Heart Block Type I
    v. Second-Degree Heart Block Type II
    w. Complete (Third-Degree) Heart Block