1. **MODULE A - Airway Management**
   1. KEY TOPICS
      1. Aspects of laryngeal airways.
      2. Aspects of esophageal airways.
      3. Aspects of tracheal airways.
   2. OBJECTIVES: *The student will be able to…*
      1. **PART 1- Pharyngeal, Laryngeal & Esophageal Airways**
         1. State the following in regards to laryngeal airway use.
            * Indications
            * Contraindications
            * Hazards/complications
         2. Describe the following airways (include insertion, advantages & disadvantages):
            * Laryngeal Mask Airway (LMA)
            * Esophageal-Tracheal Combitube (ETC)
            * King airway
         3. On an anatomical model, demonstrate proper technique for placement, maintenance and removal of the following airways:
            * Combitube
            * LMA
      2. **PART 2- Tracheal Airways** 
         1. Compare the following in regards to ORAL AND NASAL endotracheal tubes:
            * Indications
            * Physiological & psychological alterations
            * Contraindications
            * Hazards/complications (early & late)
            * Advantages
            * Disadvantages
            * Equipment needed
            * Procedure for insertion
            * Confirming placement
            * Confirming depth
            * Securing
            * Repositioning & oral care
            * Explain the following regarding endotracheal:
            * Changing process
            * Oral Care (ET tube)
            * Removal (extubation)
         2. State the correct size or formula for determining the size of endotracheal tube for each of the following patient types:
            * Pre-Term Infant
            * Full-Term Infant
            * Adult
         3. Describe the purpose for the following in regards to an endotracheal tube.
            * Oral vs. nasal
            * Curved/Macintosh vs. straight/Miller laryngoscope blade
            * Reusable vs. disposable fiberoptic
            * Laryngoscope handles (hand of use, batteries, bulbs)
            * Stylet
            * Magill forceps
            * Tube exchangers
            * Tube choices
            * Cuffs (high volume-low pressure vs. high pressure-low volume)
            * Hi/Lo Evac tubes
         4. State the correct size for determining the correct size of laryngoscope blade for each of the following patient types:
            * Pre-Term Infant
            * Full-Term Infant
            * Adult
         5. Given a clinical scenario, use the algorithms for difficult intubations and airways to determine the appropriate airway.
         6. Describe the following in regards to extubation:
            * Determining readiness to extubate
            * Difference between extubation & weaning from ventilation
            * Preparing the patient
            * Extubation procedure
            * Follow-up
            * Handling post extubation difficulties
         7. Describe the common methods for determining proper ET & tracheostomy tube placement and for securing the different airways.
         8. List the following in regards to tracheostomy tubes:
            * Indications
            * Physiological & psychological alterations
            * Contraindications
            * Hazards/complications (early & late)
            * Advantages
            * Disadvantages
            * Procedure for insertion
            * Percutaneous vs. surgical
         9. Describe the purpose of each of the following as it relates to tracheostomy tubes.
            * Obturator
            * Lubricant
            * Inner cannula
            * Outer cannula
            * Lyofoam
            * Trach care kit
            * Bivona
            * Extra length
            * Silver Jackson
            * ET tube adapter
            * Lanz
            * Buttons
            * Fenestrated
         10. Explain each of the following processes as it relates to endotracheal tube and tracheostomy tubes:
             * Cuff management
             * Changing process
             * Wound care (trach tube)
             * Communication devices
             * Removal (decannulation)
             * Describe the results of improper ET & tracheostomy care.
             * Describe the common lesions associated with tracheal tubes.
         11. State the ideal intra-cuff pressure (in cm H2O & mm Hg) and the consequences of extraordinary high pressures and demonstrate cuff pressure measurement.
         12. Differentiate between “minimal leak technique” and “minimal occlusive volume”.
         13. Describe the techniques for providing proper artificial airway humidification and the complications of inappropriate humidity.
         14. Describe the techniques for preventing nosocomial infections in patients with tracheal airways.
         15. On an anatomical model, demonstrate proper technique for placement, maintenance and removal of the following airways:
             * Endotracheal tube
             * Tracheostomy tube
         16. Demonstrate a proper method for securing an endotracheal tube.
         17. Demonstrate a proper method for performing oral care.
      3. **PART 3 – Artificial Clearance**
         1. Describe the following in regards to Suctioning according to the AARC’s Describe each of the following as it relates to suctioning according to the AARC’s Clinical Practice Guideline: *Endotracheal Suctioning of Mechanically Ventilated Adults and Children with Artificial Airways.*
            * Process
            * Goals
            * Indications
            * Contraindications
            * Hazards
            * Complications
         2. List three parameters that should be monitored on a patient prior to, during and after suctioning.
         3. State the proper level of vacuum to be used for each of the following patient types:
            * Infant
            * Child
            * Adult
         4. Describe and state the purpose of each of the following:
            * Coudé top catheter (Left Bronchitrac)
            * Closed system suction catheter
            * Red Rubber Rusch
            * Yankaeur device
            * Lukens trap
         5. Given a clinical scenario, determine the correct size of suction catheter for each of the following patient types:
            * Pre-Term Infant
            * Full-Term Infant
            * Adult
         6. List the main differences between suctioning technique for an adult, child and infant.
         7. Describe each of the following as it relates to Bronchoscopy according to the AARC’s Clinical Practice Guideline: *Fiberoptic Bronchoscopy.*
            * Process
            * Goals
            * Indications
            * Contraindications
            * Hazards
            * Complications
         8. Describe Transtracheal aspiration and explain its purpose.
         9. Explain the diagnostic & therapeutic indications for a bronchoscopy.
         10. Describe the therapist’s role in bronchoscopy.
         11. Explain what a Bal-CATH is and why it is used.
         12. Explain why a Bal-Cath might be better that tracheal aspiration or bronchoscopy for obtaining a sputum specimen.
         13. Explain the purpose for transtracheal aspiration.
      4. **PART 4- Airway Emergencies**
         1. Describe the proper procedures to follow for each of the following airway emergencies:
            * Accidental extubation
            * Difficulty with reintubation
            * Airway obstruction
            * Pilot line cut
            * Pilot balloon valve malfunction
            * Cuff leak
            * Severe hemoptysis
      5. **PART 5 – Advanced Airways**
         1. Describe the following surgical emergency airways:
            * Percutaneous transtracheal airway
            * Cricothyrotomy
         2. Given a situation where tracheostomy is not an option, describe the best procedure for relieving an inspiratory & expiratory upper airway obstruction.
         3. Given a situation where tracheostomy is not an option, describe the best procedure for relieving an inspiratory upper airway obstruction.
         4. Describe the different types of endobronchial tubes (EBT).
         5. Describe the following in regards to a double lumen airway:
            * Indication
            * Sizing
            * Insertion
            * Positioning
            * Transport
            * Maintenance
         6. Describe the different unilateral lung procedures that might be necessary.
         7. Explain the considerations when ventilating a patient with independent lung ventilation.
   3. **ASSIGNMENTS:**
      1. Class attendance & participation
      2. Take lecture notes and/or tape lecture.
      3. Reading:
         1. **Pilbeam:** *Read & do workbooks*
            * Chapter 8 - pgs. 133-134 (leaks) and pgs. 136-140 (management)
            * Chapter 12 – pgs. 230-235 (airway clearance) and pgs. 241 – 244 (flexible fiberoptic bronchoscopy)
            * Chapter 14 (VAP)
            * Chapter 17 - pgs. 345-349 (ventilator mechanical and operational hazards)
            * Chapter 18 - pgs. 355-358 (identifying the patient in sudden distress)
            * Chapter 21 - pgs. 447-453 (tracheostomy tubes, speaking valves and tracheal buttons)
         2. **Egan’s Fundamentals of RC:** *Read & do workbooks*
            * Chapter 33 – (Airway Management)
            * Chapter 34 pages, 758 – 759 (pharyngeal airways)
         3. **Instructor Handout** on Double Lumen ET Tubes and Independent Lung Ventilation
      4. Complete lab exercise:
         1. Chapter 20 – Pharyngeal Airways
         2. Chapter 21 – Suctioning
         3. Chapter 22 – Endotracheal Intubation
         4. Chapter 23 – Tracheostomy Care
         5. Chapter 24 - Artificial Airway Care and Maintenance
      5. Write the answers to the objectives in the ”First Day Handout” to reinforce learning material (optional).
   4. **EVALUATION:**
      1. Instructor constructed exams/quizzes
      2. Successful completion of lab exercises
      3. **Performance Evaluation** - Intubation with Combitube in Place
      4. **Performance Evaluation** - Extubation
      5. **Performance Evaluation** - Decannulation

1. **MODULE B - Monitoring During Mechanical Ventilation**
   1. **KEY TOPICS**
      1. Review of ventilator waveforms
      2. Flow-Time curves
      3. Pressure-Time curves
      4. Volume Time curves
      5. Volume-Pressure loop
      6. Flow-Volume loop
      7. Review of documentation
      8. Review of respiratory mechanics, time constants and auto-PEEP
   2. **OBJECTIVES**: *The student should be able to…*
      1. Set-up and adjust each curve and loop available for graphics monitoring.
      2. Given a clinical scenario, draw each of the scalar waveforms.
      3. Document a basic check of the ventilator.
      4. Perform a plateau, compliance, resistance and auto-PEEP maneuver properly.
   3. **CLASSROOM ASSESSMENT:**
      1. Class attendance & participation
      2. Take notes and/or tape lecture
      3. Readings:
         1. **Pilbeam:** *Read & do workbooks*
            * Chapter 1 pgs. 5-11 (lung characteristics) and pgs. 11-15 (definitions of pressures in positive pressure ventilation)
            * Chapter 3 (how a breath is delivered)
            * Chapter 5 pgs. 65-76 (mode of ventilation and breath delivery - up to Bilevel)
            * Chapter 8 pgs. 125-134 (up to vital signs) and pgs. 140-144 (monitoring compliance and resistance)
            * Chapter 9 (ventilator graphics)
            * Chapter 10 pgs. 190-196 (measurements)
            * Appendix C (graphics exercises)
         2. **Egan’s Fundamentals of RC:** *OPTIONAL*
            * Chapter 41 – Respiratory Failure and the Need for Ventilatory Support
            * Chapter 42 – Mechanical Ventilators
            * Chapter 43 – Physiology of Ventilatory Support
            * Chapter 44 – Initiating and Adjusting Invasive Ventilatory Support
            * Chapter 46 - Monitoring & Management of Patient in ICU
         3. Complete lab exercises
         4. Instructor Graphing assignments
         5. Instructor ATC, Rise Time, E Sens% labs
         6. Butler Laboratory Exercises (as assigned by instructor)
            * Chapter 39 – Continuous Mechanical Ventilation
            * Chapter 40 – Ventilator Modes
            * Chapter 41 – Ventilator initiation
            * Chapter 42 – Patient Ventilator System Care and Maintenance
         7. **Go to www.AARC.org** web site and download the following clinical practice guidelines:
            * *Patient-Ventilator System Checks*
            * *Capnography/Capnometry during Mechanical Ventilation*
   4. **EVALUATION**
      1. Instructor constructed exams/quizzes
      2. Successful completion of lab exercises
      3. **PERFORMANCE EVALUATION -**  ATC, Rise Time & E Sens%
      4. **PERFORMANCE EVALUATION -**  Aerosol Therapy

1. **MODULE C – Management Of The Ventilator Patient** 
   * **LESSON #1 – COPD**
   * **LESSON #2 – ASTHMA**
   * **LESSON #3 – ARDS**
   1. **KEY TOPICS**
      1. Alternatives to invasive ventilation
      2. Conventional invasive ventilation
      3. Solving Ventilation problems
      4. Solving Oxygenation Problems
      5. Infection Control & VAP
      6. Transport
      7. Non-conventional invasive ventilation
      8. Problem-solving
   2. **OBJECTIVES**: *The student should be able to…*
      1. List an alternative to invasive ventilation.
      2. Given a clinical situation with a patient suffering from each of the following conditions, establish appropriate ventilator settings.
         1. Normal lungs with some other disorder (i.e. drug overdose, post-op…)
         2. COPD
         3. Asthma
         4. ARDS
         5. Head Injury
         6. CHF and pulmonary edema
      3. Describe the indications, contraindications, hazards and apply of the following methods to treat oxygenation and ventilation problems
         * + Waveform analysis
           + PSV & ATC
           + Dual mode ventilation
           + Bi-Level
           + APRV
           + Lung recruitment maneuver
           + PEEP
           + Sighs
           + Therapeutics
           + Mechanical deadspace
           + Airway clearance
           + Permissive hypercapnia
           + Hyperventilation
           + Prone and lateral positioning
           + Transport
      4. Describe the methods to prevent and treat ventilator associated pneumonia (VAP)
      5. Describe the process for preparing the patient and equipment for transport in each of the following situations:
         1. VQ Scans
         2. MRI ventilators
         3. High altitude transport
      6. Describe the indications, contraindications and application of the following special techniques:
         1. HFOV
         2. Heli-ox
         3. ILV
         4. IPV
         5. ECLS
         6. Tracheal gas insufflation
      7. Prevent, recognize and manage each of the following clinical situations:
         1. Auto-PEEP
         2. Atelectasis
         3. Oxygen Toxicity
         4. Increased work of breathing, respiratory drive, and patient-ventilator asynchrony
         5. Disturbances in arterial blood-gas values
         6. Flail chest
         7. Bronchospasm
         8. Unilateral lung disease
         9. Ventilator Induced Lung Injury
         10. Pneumothorax
         11. Excessive secretions
         12. Abdominal distention
         13. Restrictive chest wall disorder
         14. Pulmonary Embolism
      8. Troubleshoot the patient-ventilator system for each of the following:
         1. Alarms
         2. Leaks
         3. Mechanical deadspace
         4. Ventilator Inoperative
   3. **CLASSROOM ASSESSMENT:**
      1. Class attendance & participation
      2. Take notes and/or tape lecture
      3. Readings:
         1. **Pilbeam:** *Read & do workbooks*
            * Chapter 4 pgs. 56-60 (alternatives)
            * Chapter 5 pgs. 76-83 (Bilevel and additional modes)
            * Chapter 6 (initial settings)
            * Chapter 12 pgs. 223–230 (ventilation) and pgs. 235-241 (aerosols)
            * Chapter 15 (pharmacology)
            * Chapter 18 (troubleshooting) (except 355-358 from module A)
            * Chapter 23 pgs. 515-531 (heliox & NAVA)
            * Appendix B (abnormal physiological processes)
            * Chapter 7 (final set up considerations)
            * Chapter 12 pgs. 244-252 (additional techniques)
            * Chapter 17 (effects of Positive Pressure Ventilation on the pulmonary system)
            * Chapter 13 (improving oxygenation)
            * Chapter 23 pgs. 504-515(APRV & HFV)
         2. **Egan’s Fundamentals of RC:** *OPTIONAL*
            * Chapter 23 – (COPD)
            * Chapter 27 – (ALI, CHF, ARDS)
            * Chapter 29 –( Neuromuscular & Chest Wall)
            * Chapter 41 – (Respiratory Failure)
            * Chapter 44 – (Initiating and Adjusting Ventilatory Support)
         3. Complete lab exercises as assigned by instructor:
            * Mode review,
            * Dual mode,
            * Pressure modes,
            * Aerosol therapy
         4. Butler – Chapter 40 – Ventilator Modes
   4. **EVALUATION:** 
      1. Instructor constructed exams/quizzes
      2. Successful completion of lab exercises
      3. **PERFORMANCE EVALUATIONS -** Dual mode ventilation set-up
      4. **PERFORMANCE EVALUATION -** APRV
2. **MODULE D - Newborn And Pediatric Ventilation**
   1. **KEY TOPICS**
      1. Use of CPAP
      2. Infant ventilation
      3. Pediatric ventilation
      4. Ventilator assembly.
      5. Operation verification
      6. Set up and adjustment of Ventilator
      7. Graphics monitoring and respiratory mechanics
      8. Humidification and therapeutics.
      9. Surfactant therapy
      10. Neonatal Time Cycled, Pressure-Limited Ventilation
      11. Adjuncts to conventional mechanical ventilatory support
      12. High frequency ventilation
      13. Liquid Ventilation
      14. Surfactant
      15. ECMO
      16. Nitric oxide
   2. **OBJECTIVES:** *The student should be able to…*
      1. Set-up and adjust the infant CPAP equipment
      2. Set up and adjust a neonatal ventilator given a neonatal scenario
      3. Set-up and adjust the Sensor medics HFOV 3100A
      4. Set-up and adjust a pediatric ventilator given a pediatric scenario
   3. **CLASSROOM ASSESSMENT:**
      1. Class attendance & participation
      2. Take notes and/or tape lecture
      3. Readings:
         1. **Pilbeam:** *Read & do workbooks*
            * Chapter 22 (neonatal & pediatric ventilation)
         2. **Egan’s Fundamentals of RC:** *OPTIONAL*
            * Chapter 31 – [Neonatal & Pediatric Respiratory Disorders (optional)]
            * Chapter 48 –(Neonatal & Pediatric Respiratory Care)
         3. Complete lab exercises and any additional instructor assignments
   4. **EVALUATION:**
      1. Instructor constructed exams/quizzes
3. **MODULE E - Discontinuation From Ventilation And Long Term Care**
   1. **KEY TOPICS**
      1. Assessment of weaning readiness
      2. Use of capnography with weaning
      3. Methods of weaning
      4. Ethical considerations
      5. Accessories (Passy-Muir valves…)
      6. Extubation & decannulation
      7. Special considerations in the home or ECF environment
      8. Infection control.
      9. Problems & troubleshooting
   2. **OBJECTIVES:**  *The student should be able to…*
      1. Describe the evidence-based weaning recommendations.
      2. Perform a weaning readiness assessment.
      3. Follow a weaning protocol.
      4. Assess weaning tolerance.
      5. Describe the alternative equipment used for weaning and long term care.
   3. **CLASSROOM ASSESSMENT:**
      1. Class attendance & participation
      2. Take notes and/or tape lecture
      3. Readings:
         1. **Pilbeam:** *Read & do workbooks*
            * Chapter 10 pgs. 179-186 (CO2 monitoring)
            * Chapter 20 (weaning & discontinuation)
            * Chapter 21 pgs. 429-447 (long-term ventilation)
         2. **Egan’s Fundamentals of RC:** *OPTIONAL*
            * Chapter 47 – (Discontinuing Ventilatory Support)
            * Chapter 51 – (Respiratory Care in Alternative)
         3. Complete instructor lab exercises and any additional instructor assignments.
   4. **EVALUATION**:
      1. Instructor constructed exams/quizzes