

LAST REVIEW: 2009/2010

NEXT REVIEW: 2014/2015

STATUS:

COURSE TITLE: Mechanical Ventilation Lab

COMMON COURSE NUMBER: RET 1264L

CREDIT HOURS: 1

CONTACT HOUR BREAKDOWN

CLOCK HOURS:

Lecture:

Lab: **2 hours/week**

Clinic:

Other:

PREREQUISITE(S): RET 1485, RET 1026, RET 1026L

COREQUISITE(S): RET 1264, RET 1484, RET 1832L, CVT 1200

PRE/COREQUISITE(S):

COURSE DESCRIPTION: This course allows the student to work with all facets of mechanical ventilation to gain hands on experience prior to entering their adult critical care rotation.

UNIT TITLES

- 1. Ventilator setup and application**
- 2. Airway Graphics**
- 3. Ventilator Adjustments**
- 4. Noninvasive Ventilation**

EVALUATION: The course grade is graded on a pass/fail basis. To pass the course students must complete all assignments designated by the instructor and must pass the timed comprehensive final practicum examination.

Unit 1 Ventilator setup and application**General Outcome:**

- 1.0 The student shall:** Prepare ventilators for use with patients and will practice and master the monitoring techniques normally required when using a ventilator as a life support device.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 1.1 Assemble all necessary parts of a ventilator circuit, correctly attach them to a ventilator and insure that the ventilator is functioning correctly.
- 1.11 Assemble a circuit for use with heated humidification and with an HME
- 1.12 Identify the following: Inspiratory filter, inspiratory limb (tubing), expiratory limb (tubing), patient "wye".
- 1.13 Describe where deadspace ventilation begins
- 1.14 Explain why it is necessary to have **no** leaks in the circuit
- 1.15 Show the location of the following:
- 1.151 Heated humidifier
 - 1.152 Temperature probe, heated wire plugs
 - 1.153 In line water traps for non heated wire circuits
 - 1.154 Nebulizer adaptor
 - 1.155 ETCO₂ adaptor
- 1.16 Describe proper infection control and proper disposal for ventilator circuits
- 1.17 Deliver medication to the respiratory tract via the ventilator circuit
- 1.2 Attach a lung simulator set for normal lung conditions and ventilate the lung according to the parameters established on the lab instructions. The parameters must include:
- 1.21 ventilatory mode
 - 1.22 tidal volume or peak inspiratory pressure
 - 1.23 flow sensitivity, pressure sensitivity
 - 1.24 respiratory rate
 - 1.25 peak flow rate or inspiratory time
 - 1.26 rise time
 - 1.27 PEEP level
 - 1.28 FiO₂
- 1.3 Measure the following parameters:
- 1.31 peak inspiratory pressure
 - 1.32 plateau pressure
 - 1.33 base line pressure
 - 1.34 pressure support

- 1.35 delivered minute volume
- 1.36 machine tidal volume
 - 1.37 returned volume
 - 1.38 inspiratory time
 - 1.39 I:E ratios
 - 1.40 FiO_2

- 1.4 Calculate the following:
 - 1.41 dynamic effective compliance
 - 1.42 static effective compliance
 - 1.43 airway resistance
 - 1.44 compressibility factor
 - 1.45 compressed volume
 - 1.46 patient minute volume and patient's spontaneous tidal volume

- 1.5 Set all alarms in a manner which is appropriate for the observed conditions.

- 1.6 Troubleshoot alarm situations and correct the reason for the alarm

- 1.7 Place each ventilator in the following modes of ventilation:
 - 1.71 Volume Modes:
 - 1.711 Assist Control
 - 1.712 Synchronized Intermittent Mandatory Ventilation
 - 1.72 Pressure Modes:
 - 1.721 Pressure Regulated Volume Control
 - 1.722 Pressure control
 - 1.723 Pressure Support
 - 1.725 Pressure Control Inverse Ratio Ventilation
 - 1.73 Spontaneous Modes:
 - 1.731 CPAP

Unit 2 Airway Graphics

General Outcome:

- 2.0 The student shall:** Utilize the graphics display on mechanical ventilators to assist in monitoring the patient's ventilatory parameters.

Common Course Number: RET 1264L

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 2.1 The student will access the graphics display on each ventilator and adjust the settings as needed for each patient
- 2.2 The student will monitor pressure time, flow time, volume time and hysteresis graphics to evaluate the following:
 - 2.21 Air Trapping
 - 2.22 Volume loss

 - 2.23 Lung overdistension
 - 2.24 Critical opening pressure
 - 2.25 Flow abnormalities with airway obstruction
 - 2.26 Flow improvement post bronchodilator administration
 - 2.27 Identification of breath types

Unit 3 Ventilator Adjustments

General Outcome:

- 3.0 The student shall:** Perform ventilator adjustments appropriate for the observed condition

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 3.1 Perform ventilator adjustments to correct the following:
 - 3.11 Arterial blood gas abnormality
 - 3.12 Improperly set sensitivity
 - 3.13 Improperly set peak flowrate in volume ventilation
 - 3.14 Adjust pressure support to achieve a specified tidal volume
 - 3.15 Adjust rise time
 - 3.16 Adjust termination sensitivity
- 3.2 Recognize the following and correct the problem for:
 - 3.21 Occluded endotube
 - 3.22 Ventilator disconnect
 - 3.23 Leak in the ventilator circuit
 - 3.24 Autotriggering
 - 3.25 Tube out of trachea
 - 3.26 Causes of low exhaled tidal volume
 - 3.27 Cuff leak

Common Course Number: RET 1264L

- 3.28 Inner cannula leak
- 3.29 Incorrect alarm settings or incorrect ventilator settings
- 3.30 Patient not being ventilated

Unit 4 Noninvasive Ventilation

General Outcome:

- 4.0 The student shall:** Set up non invasive ventilators, and set parameters to properly ventilate a patient.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 4.1 Set up a BiPAP device
- 4.2 Choose the proper interface (mask or nasal pillows) for BiPAP
- 4.3 Place a circuit on the BiPAP Vision and the BiPAP STD
- 4.4 Select proper settings and alarms
- 4.5 Monitor exhaled tidal volume, minute volume, leak around mask, RR and spO₂
- 4.6 Set up a Bird Mark 7 IPPB Machine
- 4.7 Choose the proper interface (mask or mouth piece)
- 4.8 Describe the parts of the circuit and place a circuit on the IPPB machine
- 4.9 Monitor inspiratory effort, inspiratory pressure, flowrate and exhaled tidal volume
- 4.10 Troubleshoot leaks caused by the patient, circuit or machine
- 4.11 Describe the indications and hazards of IPPB therapy