

**Course Number/Title:** \*\*VT 236 Principles of  
Anesthesiology and Radiology  
VT 237 Lab

**Year:** Fall 2012

**Department:** Veterinary Technology

**Credit Hours:** 3 Lecture  
2 Lab

**Required Text:** Anesthesia and Analgesia for Veterinary Technicians 4<sup>th</sup> Edition – Thomas and Lerche 2010 Radiography in Veterinary Technology-2<sup>nd</sup> Edition, Lavin Mosby's Comprehensive Review for Veterinary Technicians 3<sup>rd</sup> edition, -Tighe and Brown 2008

**Days/Time:**

Lect. MWF 8:00-8:55 a.m.

Lab: 01 MWF 12:10-2:10\*

Lab: 02 TRF 12:50-2:50\*

Lab. 03 TRF 3:00-5:00\*

*\*Every Other Friday*

**Instructor:** Dr. Catherine McMulkin

**Room #:** Lecture – FE508  
Lab – AG 603

**Office Hours:** TBA

**Phone #:** 460-5467

**Course Placement:** Sophomore in  
Veterinary Technology

**Prerequisite:** VT 130 and  
VT 131  
Veterinary Clinical Procedures and  
Lab \*

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**\*Co-requisite:** VT 237 Principles of Anesthesiology and Radiology Laboratory

**\*\*Lecture & laboratory courses are required to be taken together in the same semester.**

## Rationale

Students will acquire job skill competencies for graduate veterinary technicians in anesthesiology and diagnostic imaging.

## Course Description

Prerequisite: VT 130 and VT 131 (Veterinary Clinical Procedures and Lab) Co-requisite: VT 237 (Principles of Anesthesiology and Radiology Laboratory). This course is a study of x-ray positioning, dark room techniques, exposure factors and principles of anesthesia, including various types of anesthetics, anesthesia machine operation, monitoring and maintenance techniques.

**Topics covered:**

Anesthetic drug dosage calculations and administration

- Endotracheal intubation
- Patient monitoring and monitoring devices
- Resuscitation procedures
- Anesthetic delivery systems
- Patient history
- Patient medical records
- Fluid therapy administration
- IV catheter placement and maintenance
- Radiation safety
- Technique charts
- Patient positioning
- Maintenance and operation of x-ray equipment
- Film processing
- Special studies
- Ultrasonography

## Lab Description

Prerequisite: VT 130 and VT 131 (Veterinary Clinical Procedures and Lab) This laboratory course teaches essential skills necessary for the Veterinary Technician in the areas of anesthesiology and radiology.

### Topics covered:

- Anesthetic drug dosage calculations and administration
- Endotracheal intubation
- Patient monitoring and monitoring devices
- Resuscitation procedures
- Anesthetic delivery systems
- Patient history
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- Ultrasonography

## Course Outline

1. Anesthesiology
  - a. Preanesthetic considerations
    - i. The physical examination
    - ii. Criteria for the estimation of anesthetic risk
    - iii. Medical records
      1. Minimum data base
      2. Problem Oriented Veterinary Medical Records
        - a. Problem list
        - b. SOAP records
          - i. Subjective/objective data
          - ii. Assessment
          - iii. Plan
            1. Diagnostic plan
            2. Treatment plan
            3. Client education plan
    - iv. Factors affecting anesthesia
    - v. Anesthetic selection

- vi. Patient preparation
- b. Preanesthetics
  - i. Definitions
  - ii. Principles of the central nervous system
  - iii. Pharmaceutical agents
    - 1. Anticholinergics
    - 2. Tranquilizers
    - 3. Alpha 2 agonists
    - 4. Narcotics
    - 5. Tranquilizer/narcotic combinations
    - 6. Narcotic agonist/antagonists
    - 7. Narcotic antagonists
    - 8. Alpha 2 antagonists
- c. Introduction to general anesthesia
  - i. Components of general anesthesia
  - ii. Stages and planes of anesthesia
    - 1. Stage I
    - 2. Stage II
    - 3. Stage III
      - a. Light
      - b. Medium
      - c. Deep
    - 4. Stage IV
  - iii. Anesthetic monitoring signs associated with stages and planes
    - 1. Respiration
    - 2. Circulation
    - 3. Ocular
    - 4. Pharyngeal reflex
    - 5. Other signs
  - iv. Anesthetic monitoring
    - 1. Heart rate and rhythm
      - a. Recognizing life threatening arrhythmias
      - b. Evaluating heart rate
    - 2. Pulse characteristics
    - 3. Capillary refill time
    - 4. Blood pressure monitors
    - 5. Central venous pressure
    - 6. Mucous membrane color
    - 7. Blood loss
    - 8. Respiratory rate and depth
    - 9. Blood gases and pulse oximetry
    - 10. Capnograph
    - 11. Reflexes
    - 12. Muscle tone
    - 13. Eye position and pupil size
    - 14. Response to surgical stimulation
  - v. Recovery from anesthesia
- d. Barbiturates
  - i. General pharmacology
  - ii. Distribution
  - iii. Termination of anesthesia
  - iv. Classification
    - v. Oxybarbiturates
    - vi. Thiobarbiturates
  - vii. Administration of barbiturate anesthesia

1. IV to effect
2. Calculating dosages
3. Transient apnea
4. Perivascular accidents
- e. Other methods for producing general anesthesia
  - i. Ketamine
  - ii. Dissociative anesthetic/tranquilizer combinations
  - iii. Propofol
- f. The physiology of respiration
  - i. Control of respiration
  - ii. Effects of anesthetic agents on the respiratory centers
  - iii. Mechanical factors in breathing
    1. Hemoglobin
    2. Dead space
    3. Airway resistance
    4. Lung resistance
  - iv. Gas exchange across the alveolar-capillary membrane
  - v. Carbon dioxide transport
  - vi. Acid-base balance
  - vii. Hypoxia
    1. Types
    2. Effects
    3. Signs
- g. Inhalation anesthetics
  - i. Principles of ventilation
  - ii. Ether
  - iii. Methoxyflurane
  - iv. Isoflurane
  - v. Sevoflurane
  - vi. Nitrous oxide
- h. Methods and equipment for administration of inhalation anesthetics
  - i. Non-rebreathing
  - ii. Semi-open systems
  - iii. Semi-closed and closed systems
  - iv. Circle systems
  - v. Inhalation anesthesia
    1. Oxygen flow rates
    2. Anesthetic concentrations
    3. Machine operation
  - vi. Anesthetic records
  - vii. Machine operation and anesthetic management
    1. Machine parts
      - a. Oxygen source
      - b. Regulator
      - c. Hanger yolk
      - d. Flow meter
      - e. Oxygen flush valve
      - f. Vaporizers
      - g. Carbon dioxide absorption canister
      - h. Valves
      - i. Pressure release valve
      - j. Reservoir bag
      - k. Patient airways
    2. Endotracheal intubation
    3. Hypothermia

4. Hypostatic congestion
  5. Recovery
- i. Muscle relaxants
- j. Local anesthetics
  - i. Agents
  - ii. Local anesthesia and nerve blocks
  - iii. Toxicity
- k. Anesthetic emergencies
  - i. Respiratory emergencies
    1. Types
    2. Treatment
  - ii. Cardiovascular emergencies
    1. Types
    2. Signs of impending cardiac arrest
    3. Diagnosis of cardiac arrest
    4. Treatment
    5. External chest compressions
    6. Internal chest compressions
    7. Drug therapy
      - a. Routes
      - b. Agents
    8. Defibrillation
1. Pain management in the small animal patient
  - i. Definition of pain and suffering
  - ii. Maladaptive responses to pain
  - iii. Behaviors associated with pain
  - iv. Physiological signs of pain
  - v. General principles of analgesic therapy
  - vi. Pain management alternatives
    1. Systemic analgesics
    2. Epidural analgesia
    3. Local anesthetics
    4. Fentanyl patch
2. Radiology
  - a. What are x-rays?
    - i. Properties of x-rays
    - ii. Wavelength
    - iii. How x-rays are produced
      1. General radiation
      2. Characteristic radiation
  - b. The x-ray tube
    - i. Production of x-rays
      1. Cathode
      2. Focusing cup
      3. Anode
      4. kVp circuit
      5. Heat dispersal
    - ii. Construction of the target
      1. Focal spot
      2. Rotating anode
    - iii. Glass housing and tube housing
    - iv. Tube rating charts
    - v. Tube failure
  - c. Production of x-rays
    - i. The effect of mA and time

- ii. Learning to work mAs problems
  - iii. The effect of kVp
  - iv. Operation of the x-ray machine
  - v. Line compensator
  - vi. Difficulties with older machines
  - vii. The heel effect
- d. Rectification
  - i. Half wave rectification
  - ii. Full wave rectification
  - iii. Three phase generators
  - iv. Condenser discharge units
  - v. Exposure time
    - 1. Mechanical timers
    - 2. Synchronous timers
    - 3. Electronic timers
    - 4. Phototimers
    - 5. Testing timer accuracy
- e. X-ray film
  - i. Silver halide crystals
  - ii. Artifacts
  - iii. Film speed
- f. Intensifying screens
  - i. Cassette construction
  - ii. What is a phosphor?
  - iii. Eliminating motion
  - iv. Screen speed and detail
  - v. Rare earth screens
  - vi. Care of intensifying screens
- g. Film processing
  - i. Formation of the latent image
  - ii. Radiographic processing
  - iii. The developing room
  - iv. Film storage
  - v. Cassette storage
  - vi. Film handling
  - vii. Safe lighting
  - viii. Film developing
- h. Scatter radiation
  - i. Primary radiation
  - ii. Soft radiation
  - iii. Filtering
  - iv. Scatter radiation
  - v. Collimation
  - vi. Grids
- i. Radiation safety
  - i. Radiation damage
  - ii. Free radicals
  - iii. Cell sensitivity
  - iv. Age susceptibility
  - v. Types of damage
  - vi. Monitoring devices
  - vii. Requirements for monitoring
  - viii. Radiation safety rules
- j. Radiographic detail
  - i. Components of film quality

- ii. Definition of detail
  - iii. Processes that affect detail
    - 1. Magnification
    - 2. Distortion
    - 3. Geometric unsharpness
  - iv. Factors affecting detail
    - 1. Motion
    - 2. Film focus distance
    - 3. Film object distance
    - 4. Focal spot size
    - 5. Tube film alignment
    - 6. Film screen contact
    - 7. Film and screen speed
    - 8. Scatter radiation
    - 9. Processing technique
    - 10. Artifacts
- k. Radiographic density
  - i. Definition of density
  - ii. Factors affecting density
    - 1. Subject density
    - 2. Subject thickness
    - 3. mAs
    - 4. Film focus distance
    - 5. kVp
    - 6. Film and screen speed
    - 7. Developing time
    - 8. Developing temperature
    - 9. Scatter radiation
    - 10. Grids
- l. Radiographic contrast
  - i. Definition of contrast
  - ii. Scale of contrast
  - iii. Factors affecting contrast
    - 1. kVp
    - 2. Intensifying screens and film
    - 3. Scatter radiation
    - 4. Old developing solutions
    - 5. High developing temperature
    - 6. Fog
- m. Positioning
  - i. Restraint
  - ii. Patient preparation
  - iii. Film labeling
  - iv. Film identification
- n. Technique charts
  - i. Goals of making a technique chart
  - ii. kVp and film latitude
  - iii. Obtaining the best trial exposure
  - iv. Setting up a technique chart
    - 1. kVp-cm thickness rules
    - 2. mAs-kVp conversions
    - 3. Labeling the technique chart
    - 4. Altering the technique chart
  - v. Density corrective factors
- o. Radiology mathematics

- i. mAs problems
  - ii. mAs-kVp problems
  - iii. FFD-density problems
  - iv. Density corrective factor problems
  - v. Technique chart problems
  - vi. The Bit System
- p. Special studies
  - i. Fluoroscopy
  - ii. Computer aided tomography
  - iii. Diagnostic ultrasound
  - iv. Magnetic resonance imaging
  - v. Contrast agents
  - vi. Studies
    - 1. Esophagography
    - 2. Upper gastrointestinal series
    - 3. Barium enema
    - 4. Cystography
    - 5. Excretory urography
    - 6. Pneumoperitoneogram
    - 7. Myelography
    - 8. Fistulous tracts
    - 9. Angiography

## Course Learning Objectives Assessed

### Learning Outcomes VT236

1. Students will develop and implement the anesthetic plan, including but not limited to administration, monitoring and maintenance, and will prepare and maintain anesthetic equipment and supplies to ensure safety and reliability of operation in order to facilitate diagnostic, therapeutic or surgical procedures
2. Students will assess the need for analgesia and assist in the development and implementation of the analgesic plan to optimize patient comfort and/ or healing
3. Students will perform and document initial and ongoing evaluations of physical, behavioral, nutrition, and environmental status of animals to provide for optimal animal/ client safety and health
4. Students will produce diagnostic images following safety protocols and maintain imaging equipment for radiographs and other alternate imaging techniques

### Learning Outcomes VT237

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2. Students will produce diagnostic images following safety protocols and maintain imaging equipment for radiographs and other alternate imaging techniques

## Course Competencies

Students will be required to demonstrate proficiency in job competencies utilizing the following competency rating scale:

- 3: Excellent; able to work independently
- 2: Satisfactory; entry level skills
- 1: Unsatisfactory
- 0: Not applicable

### Course Competencies VT 236

| Task ID | Standard Criteria |
|---------|-------------------|
|---------|-------------------|



|       |  |
|-------|--|
| AN06  | <p>Recognize and respond appropriately to patients in compromised states</p> <p>Determine that crash cart is stock according to check list</p> <p>Recognize signs of poor ventilation/ respiratory arrest</p> <ul style="list-style-type: none"> <li>Decreased respiratory rate (less than 90% of resting levels—usually less than 6-8 per minute)</li> <li>Diminished chest excursions and progressive diaphragmatic respirations</li> <li>Decreased SaO<sub>2</sub></li> <li>Poor mucous membrane color</li> <li>Increased end tidal CO<sub>2</sub></li> <li>Tachycardia or bradycardia</li> </ul> <p>Respond to patient respiratory depression</p> <ul style="list-style-type: none"> <li>Assess effectiveness of cardiovascular function</li> <li>Discontinue anesthetic if problem may be due to anesthetic overdose</li> <li>Establish a patent airway</li> <li>Ventilate correctly <ul style="list-style-type: none"> <li>8-12 times per minutes</li> <li>18-20 cm H<sub>2</sub>O pressure</li> <li>Tidal volumes 6-9 ml/ lb</li> <li>Quick, smooth inspiration (1 sec)</li> <li>Followed immediately by expiration</li> <li>Insure that pressure returns to 0 cm H<sub>2</sub>O during expiration</li> </ul> </li> </ul> <p>Recognize signs of poor perfusion</p> <ul style="list-style-type: none"> <li>Hypotension <ul style="list-style-type: none"> <li>Blood pressures decreased</li> <li>Peripheral pulses diminished or absent</li> </ul> </li> <li>Poor capillary refill time</li> <li>Mucous membrane color: usually pale</li> <li>Possibly decreased SaO<sub>2</sub></li> </ul> <p>Respond to patient poor perfusion</p> <ul style="list-style-type: none"> <li>Consider decreasing amount of anesthesia</li> <li>Increase fluid administration to provide vascular filling</li> <li>Administer vasopressor agents as prescribed by your veterinarian</li> </ul> <p>Recognize signs of cardiac arrest</p> <ul style="list-style-type: none"> <li>Absence of pulse</li> <li>Absence of respiration</li> <li>Absence of heart beat</li> <li>Mucous membrane color: usually pale</li> <li>Capillary refill time: usually prolonged</li> <li>Pupils dilated</li> </ul> <p>Respond to cardiac arrest: see AN007</p> |
| AN09M | <p>Maintain and operate anesthetic delivery and monitoring equipment: defibrillator</p> <ul style="list-style-type: none"> <li>Explain how a defibrillator works</li> <li>Describe the safe and correct use of a defibrillator</li> <li>List the settings used in electrical defibrillation of the canine heart</li> </ul>   |

|       |  |
|-------|--|
| IM11  | Demonstrate proper maintenance of radiographic equipment, including recognition of faulty equipment operation  |
|       | Evaluate lead integrity of aprons and gloves using radiographs   |
|       | Evaluate integrity of safelighting conditions  |
|       | Place unexposed piece of film on working surface below safelight   |
|       | Cover $\frac{3}{4}$ of film and expose to safelight for 1 minute   |
|       | Uncover $\frac{1}{2}$ of film and expose for another minute  |
|       | Uncover $\frac{3}{4}$ of film and expose for another minute  |
|       | Uncover entire film and expose for one minute  |
|       | Process film and examine for presence of fog   |
|       | Evaluate cassettes for proper film-screen contact  |
|       | Cover cassette with a material that has sharp, clean lines (ex. Wire screen)                                   |
|       | Expose film and process  |
|       | Evaluate film for areas of decreased density and detail  |
|       | Describe how to clean screens properly   |
|       | Remove film  |
| NU05  | Clean screens with screen cleaner or mild soap and water   |
|       | Thoroughly dry   |
|       | Recall the proper procedure for reporting defects in equipment   |
|       | Obtain a thorough patient history  |
|       | Recall baseline information to be obtained on each patient   |
|       | Owner name, address, phone numbers   |
|       | Patient name, breed, sex, age, weight  |
|       | Type of diet and amount fed  |
|       | Type of housing  |
|       | Amount and type of exercise  |
| NU09A | Other pets in the household  |
|       | Define primary complaint   |
|       | Practice asking questions that cannot be answered with a simple yes or no                                      |
|       | Grooming: general considerations   |
|       | Identify basic grooming equipment  |
|       | Describe the appropriate use for identified basic grooming equipment   |
|       | Perform basic grooming skills  |
|       | Brush coat, dog  |
|       | Brush coat, cat  |
|       | Bathe dog  |
|       | Trim nails, dog  |
|       | Trim nails, cat  |
|       | Perform selected advanced grooming skills  |
|       | Clip out mats  |
|       | Clip coat to improve sanitation in long coated breeds housed in kennels  |
|       | Describe personal protective equipment that is appropriate for grooming, bathing, and dipping of small animals |

## Course Competencies VT 237

### Task ID Standard Criteria

|      |   |
|------|---|
| AN01 | Calculate dosages of appropriate anesthetic-related drugs                         |
|      | Perform drug dosage calculations using formula                                    |
|      | Weight conversions  |
|      | Metric conversions  |
|      | Drug dosage calculations  |
|      | Dilution calculations   |
|      | Calculate the preanesthetic and inducing agents as prescribed by the veterinarian |
|      | Calculations checked for accuracy by the veterinarian                             |

- AN02A      Administer appropriate anesthetic related-drugs by injection
- Verify that the correct volume of the correct drug was drawn up by showing the syringe to the veterinarian
  - Properly prepare the injection site
    - Intravenously: swab site with alcohol
    - Use standard restraint and injection techniques
  - Administer the injection correctly
    - Intravenously: properly seat the needle
    - Aspirate to observe blood flash
    - For cephalic or saphenous vein
      - Stabilize the needle and/ or syringe with the same hand that is holding the limb
    - For jugular vein
      - Stabilize the needle with the hand that was used to occlude the vein
    - Administer drug according to veterinarian's direction
    - Observe injection site for blebbing
  - Restrain the patient properly until the patient is adequately anesthetized
  - Determine depth of anesthesia
    - Utilize monitoring signs to assess muscle relaxation and depth of anesthesia
      - Jaw tone
      - Muscle relaxation
      - Rate and pattern of respiration
      - Palpebral reflex
      - Heart rate and pulse characteristics
    - Continue administration of anesthetic until appropriate depth of anesthesia is reached for the procedure (e.g., intubation)
  - Correctly treat perivascular accidents when using injectable agents that may cause perivascular irritation and necrosis
    - Determine that a perivascular accident has occurred
    - Continue induction until the patient is stable by using a different vein
    - Inject a saline into the area at a minimum amount of 2-3 times the amount of drug injected perivascularly
    - Use appropriate follow-up observations
- AN02B      Administer appropriate anesthetic-related drugs: mask
- Select the correct size mask to fit snugly with proper scavenging
  - Connect mask to anesthetic machine correctly
  - Administer proper level of anesthetic agent and oxygen to obtain a medium plane of anesthesia
- AN02D      Administer appropriate anesthetic related-drugs by endotracheal tube
- List signs that the endotracheal tube is improperly placed
  - Connect endotracheal tube to anesthetic machine correctly
  - Administer proper level of anesthetic agent and oxygen to obtain a medium plane of anesthesia

- Place endotracheal tubes in patients when appropriate
  - Assemble necessary equipment
    - Correct size endotracheal tube
    - Lubricant
    - Gauze
    - Syringe to inflate cuff
    - Laryngoscope as needed
  - Check patency of cuff by inflating and applying pressure to cuff
  - Correctly lubricate cuff
  - Position patient
    - Determine that the patient is in an appropriate stage and plane of anesthesia to attempt intubation
    - Recognize signs of laryngospasm and respond appropriately
      - Deepen anesthesia
      - Use topical anesthetic as needed
  - Place endotracheal tube
    - Direct visualization in dogs and cats
    - Manage potential laryngospasm
      - More of a problem in cats
      - Utilize lidocaine spray topically on larynx
        - Use sparingly
        - Avoid laryngeal edema from excessive topical anesthetic
    - Check tube placement by
      - Visualization
      - Feeling for tube in trachea
      - Other methods may be used only to confirm the above findings
  - Insert tube to correct level
  - Secure tube to patient with gauze
  - Inflate cuff in the correct manner
    - Close pop off valve
    - Squeeze bag to pressure of 18-20 cm H<sub>2</sub>O
    - Listen for leaks
    - If leaks occur, fill cuff with 1-2 ml more of air and recheck
    - Repeat procedure until the cuff holds pressure
    - Do NOT over-inflate cuff
    - Open pop off valve after testing
  - Ascertain correct placement by auscultation of both right and left lung fields
  - Deflate cuff either after terminating anesthesia or when the patient is swallowing if regurgitation is likely
  - Extubate when the patient is swallowing or, if brachycephalic, after a return of considerable consciousness
  - Clean endotracheal tube correctly
    - Inflate cuff so that it may be effectively cleaned
    - Scrub inside and outside of tube with chlorhexidine using a test tube brush
    - Rinse well
    - Deflate cuff
    - Disinfect by placing in chlorhexidine solution for a minimum of 10 minutes
    - Inflate cuff and rinse tube
    - Air dry tube before storage
    - Deflate cuff for storage

Utilize clinical signs and appropriate equipment to monitor patient status in all stages of anesthetic procedures (e.g., esophageal stethoscope, Doppler, pulse oximeter)

Assess the patient's depth of anesthesia at the same level as the instructor's assessment

List all common monitoring signs and assessment criteria available to assess depth of anesthesia

#### Reflexes

- Palpebral reflex
- Pedal reflex
- Swallowing reflex
- Laryngeal reflex
- Anal sphincter reflex

#### Eyeball position

#### Muscle relaxation

- Jaw tone: Open jaw maximally
- Passive resistance to flexion
- Anal sphincter tone

#### Heart rate and rhythm

#### Strength of cardiac contraction

#### Pulse rate and quality

- Femoral
- Dorsal pedal
- Metacarpal
- Lingual

#### Mucous membrane color

#### Capillary refill time

#### Respiratory rate, depth and pattern

#### Blood pressure

#### Blood loss

#### Blood oxygenation/ blood gases

#### End tidal carbon dioxide

#### Electrocardiography

Describe monitoring signs consistent with each stage and plane of anesthesia

#### Stage I: voluntary movement

Lasts from initial administration of induction agent to loss of consciousness

#### Variable signs

- Heart: strong, rapid, heart beat
- Respiration: increased, may be panting
- Pulse: strong, accelerated, may be arrhythmia
- Eye: centrally located
- Palpebral reflex strong
- Swallowing and laryngeal reflex: present
- Muscle tone: good

#### Stage II: involuntary movement

Lasts from loss of consciousness to regular breathing pattern.

#### Variable signs

- Reflexes more exaggerated
- May see violent struggling
- May see breath holding
- May see tachypnea and hyperventilation
- Respiration may be irregular
- Pulse: strong and accelerated, occasionally arrhythmias
- Eye position: centrally located
- Palpebral reflex: strong
- Swallowing and laryngeal reflex: present
- Muscle tone: good

#### Stage III: surgical anesthesia

Characterized by progressive depression of reflexes, increasing muscle relaxation and progressive respiratory depression

#### Stage III: Light plane

- Eyeball movement ceases
- Respirations regular
- Both thoracic and diaphragmatic movements
- Pulse: strong
- Heart rate: usually slightly higher than resting

- AN07      Effectively perform appropriate resuscitation procedures as needed (e.g., calculate and administer appropriate anesthetic antagonists and emergency drugs as directed)
- Perform CPR on a resuscitation model
    - Place “patient” in lateral recumbency and trap with your body  
(Alternatively, some patients may benefit from CPR performed in dorsal recumbency.)
    - Use correct hand position
    - Use correct body position and bend from waist
    - Compress thorax 35-40% of circumference of chest
    - Use compression rates of 80-120 per minute
    - Perform compression to respiration at a ratio of 5 to 1
    - Ventilate to pressures of 20-30 cm H<sub>2</sub>O
    - Assess effectiveness of cardiac compressions
  - List drugs commonly used for resuscitation
    - Atropine
    - Epinephrine
    - Sodium bicarbonate
    - Fluids
  - Calculate and administer drugs appropriately as directed
- AN08      Complete controlled drugs log
- Correctly identify substance as a controlled drug
  - Obtain controlled substance log
  - Obtain controlled drug from instructor
    - Visually confirm that the amount in the vial corresponds to the amount remaining as recorded in the controlled log
    - Report any discrepancies immediately to the instructor.
    - In the instructor’s presence, withdraw calculated amount of drug into syringe
    - Return drug to instructor to be placed in locked drug cabinet
  - Record information in controlled log book
    - Identify vial number and correct log page
    - Record the date, patient and client, veterinarian, student, amount withdrawn and amount remaining
  - For unopened vials
    - Identify the vial number and record the date the vial was opened and the person who opened the vial
    - Record the initial amount of the drug in the vial
  - For empty vials
    - Identify the vial number
    - Record the date the vial was discarded and the person discarding the vial
    - Properly discard the empty vial

|        |   |
|--------|---|
| AN08D2 | <p>Maintain and operate anesthetic delivery and monitoring equipment: rebreathing systems</p> <ul style="list-style-type: none"> <li>Use proper calculated oxygen flow rates for different system types <ul style="list-style-type: none"> <li>Induction: 1-8 liters</li> <li>Maintenance closed system: 5 ml/ lb/ min</li> <li>Maintenance semi-closed system: 15 ml/ lb/ min</li> <li>Non-rebreathing system: 200 ml/ lb/ min</li> </ul> </li> <li>Perform proper machine induction <ul style="list-style-type: none"> <li>Use induction oxygen flow rates</li> <li>Use induction anesthetic concentrations</li> <li>Observe rebreathing bag to prevent positive pressure in circle system</li> <li>Use proper airway support</li> <li>Correctly handle breath holding or apnea</li> </ul> </li> <li>Perform proper maintenance procedures <ul style="list-style-type: none"> <li>Monitor and record assessment signs on anesthetic record</li> <li>Report vital signs every 5-10 minutes to surgeon</li> <li>Sign patient every 10 minutes when using spontaneous ventilation</li> <li>Observe rebreathing bag and manometer for pressure</li> <li>Monitor soda lime use</li> <li>Monitor dome valve operation</li> <li>Control oxygen flow rate and anesthetic concentration to maintain at an appropriate depth of anesthesia</li> </ul> </li> <li>Perform proper recovery procedures <ul style="list-style-type: none"> <li>Discontinue anesthetic <ul style="list-style-type: none"> <li>Flush anesthetic from circle for faster recovery <ul style="list-style-type: none"> <li>Disconnect airways from patient</li> <li>Plug end of airways</li> <li>Squeeze rebreathing bag with the pop off valve open</li> <li>Flush circle with oxygen flush valve 2-3 times</li> </ul> </li> </ul> </li> <li>Reconnect patient airways to endotracheal tube <ul style="list-style-type: none"> <li>Discontinue oxygen after 5 minutes and place patient on room air</li> <li>Extubate when patient is swallowing</li> <li>Return to run when ambulatory. If placing in cage, remove all cage furniture and observe until ambulatory.</li> </ul> </li> </ul> </li> </ul> |
| AN09A  | <p>Maintain and operate anesthetic delivery and monitoring equipment: pulse oximeter</p> <ul style="list-style-type: none"> <li>Place probe correctly on the tongue</li> <li>Obtain a strong capillary pulse on the unit</li> <li>Explain how the SaO<sub>2</sub> values are obtained</li> <li>Recall normal SaO<sub>2</sub> values (&lt;93%)</li> <li>Recall that low SaO<sub>2</sub> values (&gt;93%) are generally associated with hypoxia, but may be associated with poor peripheral perfusion</li> <li>Recall that SaO<sub>2</sub> values &gt;85% indicate hypoxia</li> <li>Identify problems that may occur with pulse oximetry units <ul style="list-style-type: none"> <li>Poor capillary pulse and perfusion</li> <li>Interference with lights</li> <li>Improper placement of probes</li> </ul> </li> </ul>   |
| AN09B  | <p>Maintain and operate anesthetic delivery and monitoring equipment: esophageal stethoscope</p> <ul style="list-style-type: none"> <li>Select appropriate size probe</li> <li>Lubricate probe</li> <li>Insert probe to the correct level</li> <li>Identify cardiac and respiratory sounds</li> </ul>   |

Maintain and operate anesthetic delivery and monitoring equipment: electrocardiograph (e.g., recognize abnormal rhythms/ audible sounds)

- Place patient on non-conductive surface, such as a towel
- Position patient: for full ECG in right lateral recumbency with legs perpendicular to body. For rhythm strip position is less important.
- Attach leads to patient: for full ECG attach just above elbow and just above stifles
- Apply conducting media: for quick tracings, alcohol is appropriate. For anesthetic monitoring use gel
- Standardize the machine to 1 cm = 1 mV
- Set paper speed to 50 mm per second
- Obtain a rhythm strip tracing, preferably lead II
- Identify ECG complexes
  - P wave
  - Pr interval
  - QRS
  - ST segment
  - T wave
  - Heart rate
- Identify common abnormal rhythms
  - Normal sinus rhythm
  - Sinus arrhythmia
  - Sinus bradycardia
  - Sinus tachycardia
  - First degree heart block
  - Second degree heart block
  - Third degree heart block
  - Premature ventricular contraction(s)
  - Multifocal PVC's
  - Ventricular tachycardia
  - Ventricular asystole
  - Ventricular fibrillation
- Identify common ECG artifacts
  - Movement
  - Electrical interference
  - Misplaced electrodes



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| AN09D1 | <p>Maintain and operate anesthetic delivery and monitoring equipment: anesthetic machines: general considerations</p> <p>Identify parts of the anesthetic machine</p> <ul style="list-style-type: none"> <li>Oxygen source</li> <li>Pressure regulator</li> <li>Yolk</li> <li>Yolk plug</li> <li>Oxygen cylinder</li> <li>Pin indexing</li> <li>Oxygen cylinder gauge</li> <li>Flow meter</li> <li>Vaporizer</li> <li>Carbon dioxide absorption canister</li> <li>Dome valves</li> <li>Patient airways</li> <li>Y piece</li> <li>Rebreathing bag</li> <li>Manometer</li> <li>Pressure release valve</li> <li>Scavenger system</li> </ul> <p>Assemble machine for circle system</p> <ul style="list-style-type: none"> <li>Select appropriate size rebreathing bag (minimum 2-3 times the tidal volume)</li> <li>Select appropriate size airways</li> <li>Assemble dome valves</li> <li>Attach scavenger hose to scavenger system outlet</li> <li>Insert oxygen hose coupling into mainline oxygen outlet</li> </ul> <p>Perform anesthetic machine check</p> <ul style="list-style-type: none"> <li>Check oxygen pressure in bulk tank—change if pressure is less than 200 psi</li> <li>Check oxygen pressure in auxiliary tank</li> <li>Bleed pressure off pressure gauge on yolk</li> <li>Check anesthetic vaporizer—fill if less than half full</li> <li>Check dome valves for freedom of movement</li> <li>Check soda lime use—change if less than 30 minutes left</li> <li>Close pop-off valve and plug patient airways</li> <li>Check oxygen flow meter by turning on flow meter to 1-2 liters of oxygen and watching for filling of rebreathing bag</li> <li>Shut off flow meter</li> <li>Pressurize circle with oxygen flush valve until 30 cm H<sub>2</sub>O registers on the pressure gauge. Pressure should hold. If not, identify leak(s) and correct</li> <li>Open pop off valve to release pressure in circle. Squeeze bag out to limit exposure to waste gases</li> </ul> <p>Properly intubate patient—see AN003</p> |
| AN09F  | <p>Maintain and operate anesthetic delivery and monitoring equipment: ambu bag</p> <ul style="list-style-type: none"> <li>Attach Ambu bag to anesthetic machine</li> <li>Ventilate properly</li> </ul>   |
| AN09G  | <p>Maintain and operate anesthetic delivery and monitoring equipment: scavenging systems</p> <ul style="list-style-type: none"> <li>Explain hazards of fugitive gases</li> <li>Explain differences between active and passive scavenging systems</li> <li>Properly attach scavenging system to anesthetic delivery system</li> </ul>   |

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| AN09H | <p>Maintain and operate anesthetic delivery and monitoring equipment: oxygen sources</p> <ul style="list-style-type: none"> <li>Recognize sizes of oxygen tanks and location <ul style="list-style-type: none"> <li>H tank</li> <li>E tank</li> </ul> </li> <li>Describe the function and location of pin indexing system</li> <li>Verify amount of oxygen in tank with cylinder pressure gauge <ul style="list-style-type: none"> <li>Large tank—check gauge</li> <li>Auxillary tank <ul style="list-style-type: none"> <li>Turn on cylinder valve</li> <li>Check pressure gauge</li> <li>Turn off cylinder valve</li> <li>Bleed pressure off</li> </ul> </li> </ul> </li> </ul>  |
| AN09I | <p>Maintain and operate anesthetic delivery and monitoring equipment: respiratory monitors</p> <ul style="list-style-type: none"> <li>Verify the respiratory monitor is in working order</li> <li>Attach monitor to patient properly</li> <li>Clean and disinfect monitor after use</li> <li>Identify problems with respiration and respond properly</li> </ul>  |
| AN09J | <p>Maintain and operate anesthetic delivery and monitoring equipment: blood pressure monitoring devices</p> <ul style="list-style-type: none"> <li>List normal blood pressure values for the dogs and cat <ul style="list-style-type: none"> <li>Systolic</li> <li>Diastolic</li> <li>Mean arterial pressure</li> </ul> </li> <li>Use Doppler unit correctly <ul style="list-style-type: none"> <li>Palpate digital pulse and clip hair over area</li> <li>Place crystal over pulse using appropriate connecting gel to obtain audible signal</li> <li>Tape crystal in place</li> <li>Select appropriate size cuff (40-60% of limb circumference)</li> <li>Place cuff correctly <ul style="list-style-type: none"> <li>Proximal to artery</li> <li>With artery mark on cuff over artery</li> <li>Attach to sphygmomanometer</li> </ul> </li> <li>Inflate cuff until no audible signal is heard</li> <li>Gradually release pressure from cuff until audible sound is heard to identify systolic blood pressure</li> </ul> </li> <li>Use oscillometric unit correctly <ul style="list-style-type: none"> <li>Verify that the unit if functioning properly</li> <li>Palpate digital pulse</li> <li>Select the proper size cuff (40-60% of the circumference of the limb)</li> <li>Place cuff over artery</li> <li>Attach cuff to machine tubing</li> <li>Operate machine to obtain systolic, diastolic, MAP, and HR readings</li> <li>Set machine to automatically take readings every 5 minutes</li> <li>Set machine alarms to appropriate values</li> </ul> </li> </ul> |
| AN09K | <p>Maintain and operate anesthetic delivery and monitoring equipment: laryngoscopes</p> <ul style="list-style-type: none"> <li>Select appropriate size laryngoscope blade</li> <li>Assemble laryngoscope blade and handle</li> <li>Verify that laryngoscope is in working order</li> <li>Utilize laryngoscope to visualize larynx</li> <li>Clean and disinfect blade after use</li> </ul>  |

## Implement effective radiographic quality control measures

## Inspect darkroom

- General cleanliness
- Proper supplies
- Proper safelight function
- Absence of light leaks

## Inspect manual processing equipment

- Remove lids
- Check fluid levels
- Add replenisher as needed
- Agitate solutions
- Check temperature of solutions

## Inspect automatic processing equipment

- Inspect fluid levels
- Turn power on
- Turn water on
- Close wash drain
- Check gears and motor
- Replace cover and allow processor to warm up
- Run two cleaning films through processor

## Inspect x-ray machine for proper function

## Mobile machine

- Plug into outlet
- Turn power on
- Inspect tube head and position
- Remove collimator cover
- Adjust FFD
- Perform line compensator check

## Stationary machine

- Turn power on
- Inspect tube head and position
- Adjust FFD
- Perform line compensator check

## Correctly record x-ray log information

- Accession number
- Exposure sheet
- Film envelope

## Evaluate radiographic quality as substandard or diagnostic using the following:

- Density
- Detail
- Contrast
- Positioning
- Labeling
- Artifacts
- Identify errors on the finished film and suggest options to improve film quality

## Identify common film artifacts

- Scratches
- Dirt or hair on intensifying screens
- Fingerprints
- Light leaks
- Collimator errors

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| IM03  | <p>Develop and properly utilize accurate radiographic technique charts</p> <p>For technique chart using canine abdomen</p> <p>Select an average sized dog: 10-15 cm abdomen</p> <p>Accurately measure abdomen using caliper</p> <p>Determine trial machine settings</p> <p>kVp: 2 x cm thickness + 50 kVp</p> <p>FFD: 30-40 inches</p> <p>mAs: 1-5</p> <p>Obtain trial radiographs: usually original mAs, ½ mAs, 2x mAs and 4x mAs</p> <p>Process films normally</p> <p>Evaluate film quality with emphasis on film density</p> <p>Continue trial exposures as needed</p> <p>If too dark ½ mAs or subtract 10 kVp</p> <p>If too light 2x mAs again or add 10 kVp</p> <p>Select film with the correct exposure</p> <p>Construct technique chart using appropriate rules</p> <p>+ or – 2 kVp for every cm change in thickness less than 80</p> <p>+ or – 3 kVp for every cm change in thickness between 80 and 99</p> <p>+ or – 4 kVp for every cm change in thickness between 100 and 119</p> <p>+ or – 5 kVp for every cm change in thickness between 120 and 139</p> <p>Adjust technique chart using kVp-mAs conversions to allow setting that can be made on the machine</p> |
| IM04A | <p>Properly position animals for radiographic studies: general considerations</p> <p>Select the smallest size cassette that allows visualization of the area of interest</p> <p>Use appropriate patient restraint</p> <p>Collimate the primary beam to the appropriate size for the subject area</p> <p>Use labels correctly</p> <p>Properly filled out</p> <p>Proper location on the film</p> <p>Perform standard radiographic safety procedures during exposure</p>  |
| IM04B | <p>Properly position dogs for radiographic studies</p> <p>Use appropriate topographical/ anatomical landmarks to position patient and center x-ray beam for exposure for the following types of positions</p> <p>Abdomen</p> <p>Thorax</p> <p>Pelvis</p> <p>Shoulder</p> <p>Humerus</p> <p>Elbow</p> <p>Carpus</p> <p>Femur</p> <p>Stifle</p> <p>Hock</p> <p>Cervical spine</p> <p>Lumbar spine</p>  |

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| IM04C | <p>Properly position cats for radiographic studies</p> <p>Use appropriate topographical/ anatomical landmarks to position patient and center x-ray beam for exposure for the following positions</p> <ul style="list-style-type: none"> <li>Abdomen</li> <li>Thorax</li> <li>Pelvis</li> <li>Shoulder</li> <li>Humerus</li> <li>Elbow</li> <li>Carpus</li> <li>Femur</li> <li>Stifle</li> <li>Hock</li> <li>Cervical spine</li> <li>Lumbar spine</li> </ul>   |
| IM04D | <p>Properly position horses for radiographic studies</p> <p>Use appropriate topographical/ anatomical landmarks to position patient and center x-ray beam for exposure for the following positions</p> <ul style="list-style-type: none"> <li>Carpal series</li> <li>Fetlock</li> <li>Pastern</li> <li>Hock series</li> </ul>   |
| IM05A | <p>Utilize radiographic equipment to expose x-ray film: general considerations</p> <ul style="list-style-type: none"> <li>Select the appropriate size film and correct film/ screen combination</li> <li>Obtain an accurate measurement of the part to be radiographed</li> <li>Read exposure factors on technique chart</li> <li>Make correct machine settings</li> <li>Collimate the primary beam to the appropriate size</li> <li>Correctly expose the film</li> <li>Use standard radiographic safety procedures</li> </ul>                        |
| IM05B | <p>Utilize radiographic equipment to expose x-ray film: stationary machine</p> <ul style="list-style-type: none"> <li>Successfully complete IM05 on the stationary machine</li> </ul>   |
| IM05C | <p>Utilize radiographic equipment to expose x-ray film: portable unit</p> <ul style="list-style-type: none"> <li>Successfully complete IM05 on the portable machine</li> </ul>  |
| IM07  | <p>Label, file and store film</p> <ul style="list-style-type: none"> <li>Apply permanent label to radiograph prior to exposure</li> <li>Apply all required information to the label</li> <li>Apply label so that there is no interference with radiographic image</li> <li>Place processed radiographs in appropriate labeled film envelop</li> <li>File radiographs in storage cabinet in numerical order</li> </ul>   |
| IM08  | <p>Complete radiographic logs, reports, files and records</p> <ul style="list-style-type: none"> <li>Fill out radiographic log book correctly</li> <li>Fill out radiographic exposure form correctly</li> </ul>   |
| IM09A | <p>Perform positive and negative radiographic contrast studies</p> <ul style="list-style-type: none"> <li>Prepare patient for radiographic contrast procedure <ul style="list-style-type: none"> <li>Withhold food</li> <li>May require enema</li> </ul> </li> <li>Obtain diagnostic survey radiographs</li> <li>Select appropriate contrast media for study</li> <li>Administer contrast media</li> <li>Obtain diagnostic radiographs following administration of contrast media</li> <li>Perform standard radiographic safety procedures</li> </ul> |

- IM09B      Perform positive and negative radiographic contrast studies: GI series  
              Properly prepare the patient  
                  Withhold food 12 hours  
                  Administer a warm water enema 4-6 hours prior to the study  
              Obtain diagnostic survey radiographs  
              Calculate the dose of Gastrographin to be administered  
              Administer contrast media and obtain diagnostic radiographs  
                  Time 0   VD and Left Lat center over stomach  
                  Time 15 min   VD and Right Lat center as for abdomen  
                  Time 30 min   VD and Right Lat center as for abdomen  
                  Time 45 min   VD and Right Lat center as for abdomen  
                  Time 60 min   VD and Right Lat center as for abdomen  
                  Every 30 min thereafter until contrast media reaches colon
- IM09C      Perform positive and negative radiographic contrast studies: pneumocystogram  
              Properly prepare the patient  
                  Withhold food 12 hours  
                  Administer a warm water enema 4-6 hours prior to the study  
              Obtain diagnostic survey radiographs  
              Calculate the amount of air to be administered  
              Aseptically catheterize the bladder and remove urine  
              Infuse air into the bladder  
              Obtain lateral radiograph  
              Aspirate air from bladder
- IM09D      Perform positive and negative radiographic contrast studies: intravenous pyelogram  
              Properly prepare the patient  
                  Withhold food 12 hours  
                  Administer a warm water enema 4-6 hours prior to the study  
              Obtain diagnostic survey radiographs  
              Calculate dose of Renografin to be administered  
              Administer contrast media rapidly IV (may cause nausea and vomiting)  
              Obtain diagnostic radiographs  
                  10 minutes   VD and right lateral  
                  15 minutes   VD and right lateral
- IM10      Learn radiographic techniques utilized in screening for canine hip dysplasia  
              Sedate or anesthetize patient for proper muscle relaxation  
              Properly position patient for OFA quality pelvic radiographs  
              Evaluate processed radiographs for accuracy of positioning
- IM12      Use ultrasonography equipment  
              Prepare ultrasound machine for use  
              Prepare patient for ultrasonographic examination  
              Restrain patient for examination  
              Apply appropriate contact gel to study area  
              Clean transducer probe and machine for storage

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| NU06E   | <p>Assess hydration status</p> <ul style="list-style-type: none"> <li>On the physical examination of a patient <ul style="list-style-type: none"> <li>Determine the animal's skin turgor <ul style="list-style-type: none"> <li>Feel the skin between your fingers over the lateral thorax and determine if the skin feels doughy</li> <li>Pinch and tent the skin of the lateral thorax and determine how long it takes for the skin to return to the normal position</li> </ul> </li> <li>Determine the turgor of the eye globe by closing the lids and gently pressing in on the globe</li> <li>Assess the urine specific gravity</li> <li>Assess the mucous membrane dryness and color and capillary refill time</li> <li>Determine the PCV and total solids of the plasma</li> </ul> </li> <li>Assess the hydration status of the patient in terms of percent body water deficit <ul style="list-style-type: none"> <li>0-5%: skin feels doughy, urine concentrated, eye globe soft</li> <li>7-8%: skin stays tented for a 2-3 seconds, urine concentrated, globe soft, mucous membranes dry and pale PCV and TS elevated</li> <li>10-12%: after tenting and twisting the skin, the twist remains for a few seconds, mm color and capillary refill time may suggest hypovolemic shock</li> <li>12-15%: signs are intensified with shock and death imminent</li> </ul> </li> </ul> |
| NU07A1A | <p>Perform intravenous injection: cephalic: dog</p> <ul style="list-style-type: none"> <li>Select appropriate size needle and syringe</li> <li>Determine that the handler is restraining the animal correctly</li> <li>Occlude the cephalic vein</li> <li>Apply alcohol over the site to dilate the vein</li> <li>Perform venipuncture <ul style="list-style-type: none"> <li>Extend leg fully</li> <li>Palpate the vein</li> <li>Align needle over the vein with the bevel up</li> <li>Use correct angle to pierce the skin</li> <li>Pop the needle into the vein</li> <li>Change needle angle to avoid exiting the opposite side of the vein</li> <li>Seat the needle</li> <li>Stabilize the syringe or needle with the hand holding the limb</li> <li>Release pressure on the vein</li> </ul> </li> <li>Perform injection</li> <li>Apply pressure over venipuncture site with dry cotton swab</li> <li>Remove needle and continue to apply pressure until bleeding has stopped</li> </ul>   |
| NU07A3  | <p>Perform intravenous injection: saphenous: dog</p> <ul style="list-style-type: none"> <li>Select appropriate size needle and syringe</li> <li>Determine that the handler is restraining the animal correctly</li> <li>Occlude the saphenous vein</li> <li>Apply alcohol over the site to dilate the vein</li> <li>Perform venipuncture <ul style="list-style-type: none"> <li>Extend leg fully</li> <li>Palpate the vein</li> <li>Align needle over the vein with the bevel up</li> <li>Use correct angle to pierce the skin</li> <li>Pop the needle into the vein</li> <li>Change needle angle to avoid exiting the opposite side of the vein</li> <li>Seat the needle</li> <li>Stabilize the syringe or needle with the hand holding the limb</li> <li>Release pressure on the vein</li> </ul> </li> <li>Perform injection</li> <li>Apply pressure over venipuncture site with dry cotton swab</li> <li>Remove needle and continue to apply pressure until bleeding has stopped</li> </ul>   |

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| NU14-01A | Perform microchip scanning<br>Obtain microchip scanner<br>Orientate scanner along dorsal axis of patient<br>Make smooth longitudinal passes along dorsal back covering the entire back area<br>Repeat scan with passes perpendicular to the longitudinal plane<br>Scanner will beep if microchip is present and display number<br>If microchip is absent, scanner will display no microchip   |
| NU27C1   | Place intravenous catheters: cephalic<br>Organize needed supplies<br>IV Catheter<br>Tape<br>Infusion plug<br>Saline<br>Materials to surgically prep venipuncture site<br>Clip and prep venipuncture site<br>Insert needle/ catheter into vein and slide catheter forward<br>Cap catheter with infusion plug<br>Tape catheter on to leg<br>Place first piece of tape sticky side up around catheter and then leg<br>Place another piece of tape distal to catheter to cover hair<br>Place tape as needed to secure catheter<br>Tape infusion plug, sticky side up and around leg<br>Aspirate blood and infuse saline to confirm patency  |
| NU27C2   | Place intravenous catheters: saphenous<br>Organize needed supplies<br>IV Catheter<br>Tape<br>Infusion plug<br>Saline<br>Materials to surgically prep venipuncture site<br>Clip and prep venipuncture site<br>Insert needle/ catheter into vein and slide catheter forward<br>Cap catheter with infusion plug<br>Tape catheter on to leg<br>Place first piece of tape sticky side up around catheter and then leg<br>Place another piece of tape distal to catheter to cover hair<br>Place tape as needed to secure catheter<br>Tape infusion plug, sticky side up and around leg<br>Aspirate blood and infuse saline to confirm patency |
| NU27D    | Maintain and care for catheters<br>Properly prep venipuncture site to reduce incidence of infection<br>Flush catheter with saline or heparinized saline (5 u/ml) to maintain patency<br>Properly tape in catheter to prevent accidental removal by patient<br>Maintain properly IV drip rate to maintain patency of catheter  |
| NU27E    | Determine and maintain fluid infusion rate<br>Calculate surgical fluid replacement rates at 10 ml/ kg/ hr<br>Monitor gravity feed drip to maintain proper infusion rate<br>Fill drip chamber correctly<br>Empty drip chamber correctly<br>Select appropriate IV drip for the drip rate and type of fluid container<br>Expel all air from IV drip line<br>Attach drip line to IV catheter  |

## Method of Instruction

Lecture, discussion, laboratory

## Method of Evaluation

All points awarded in this course are converted to a letter grade according to the following scale:

*Last Revised 8/1/12*



90 - 100% = A  
 80 - 89% = B  
 70 - 79% = C  
 < 70% = F

| Lecture Evaluations                            | Number Given | Points                   | Total Points            |
|--|--------------|--------------------------|-------------------------|
| Written Examinations                           | 5            | 100                      | 500                     |
| Written Comprehensive Final                    | 1            | 150                      | 150                     |
| Assessments                                    | 4            | 3                        | 12                      |
| Medical Record Assignment                      | 1            | 25                       | 25                      |
| Newsletter Assignment                          | 2            | 10                       | 20                      |
| Group History Discussion                       | 1            | 10                       | 10                      |
| History Assignment                             | 1            | 10                       | 10                      |
| Drug Worksheet Assignment                      | 1            | 5                        | 5                       |
| Other assignments as required to be determined | Variable     | No more than 5% of grade |                         |
| Quizzes (announced/unannounced)                | Variable     |                          | Also included in grade. |

| Lab Evaluations   | Points | Percent of Grade |
|---|--------|------------------|
| Anesthesiology Practical  | 150    | 35%              |
| Quizzes<br>Dug Quiz—71 pt<br>Machine Quiz—55 pt<br>Radiology Anatomy Quiz—25 pt | 71     | 15%              |
| Radiology Practical   | 150    | 35%              |
| Assessments   | 114    | 15%              |
| Total   | 565    | 100%             |

Students must pass both the radiology practical and the anesthesiology practical with a grade of 85% or better in order to complete the course. Students may retake a practical one time.

Students must complete all required assessments with a 2.5 or greater in order to complete the course. Students may retake on-line assessments (multi-take assignments) multiple times. Students may retake hands-on assessments one time.

Assessment score ratings are as follows;

- 3: Excellent; able to work independently
- 2: Satisfactory; entry level skills
- 1: Unsatisfactory
- 0: Not applicable

Total assessment scores can be converted to a percentage score according to the following scale:

|            |           |           |
|------------|-----------|-----------|
| 3.00 = 100 | 2.67 = 89 | 2.34 = 78 |
| 2.97 = 99  | 2.64 = 88 | 2.31 = 77 |
| 2.94 = 98  | 2.61 = 87 | 2.28 = 76 |
| 2.91 = 97  | 2.58 = 86 | 2.25 = 75 |
| 2.88 = 96  | 2.55 = 85 | 2.22 = 74 |
| 2.85 = 95  | 2.52 = 84 | 2.19 = 73 |
| 2.82 = 94  | 2.49 = 83 | 2.16 = 72 |

|      |   |    |      |   |    |      |   |    |
|------|---|----|------|---|----|------|---|----|
| 2.79 | = | 93 | 2.46 | = | 82 | 2.13 | = | 71 |
| 2.76 | = | 92 | 2.43 | = | 81 | 2.10 | = | 70 |
| 2.73 | = | 91 | 2.40 | = | 80 | 2.00 | = | 70 |
| 2.70 | = | 90 | 2.37 | = | 79 |      |   |    |

## Course Requirements

This course adheres to published Veterinary Technology Program Policies and Procedures; however, course requirements may be more stringent.

The online portion of this course adheres to the online and hybrid course policies as published in the Veterinary Technician Policies and Procedures. All Veterinary Technology Program assessments must be successfully completed by each student. Failure to successfully complete all assessment documents may result in a failing grade for the course in which that assessment is evaluated.

Because this course is a required course for graduation with a degree in Veterinary Technology, course requirements will be interpreted in light of the intent and objectives of the Veterinary Technology Program.

It is imperative that the students review Veterinary Technology Program Policies and Procedures and understand the safety guidelines for this course as well as instructor's expectations of the students' professional attitude and classroom conduct.

Veterinary Technology Program Policies and Procedures Section 9.02 states, "the Veterinary Technology student is expected to act in a professional manner in all classroom and activity situations. Students will act professionally in their dress, language and demeanor." Students who are disruptive to fellow classmates or the instructor by acting in an unprofessional manner may be required to leave the classroom.

Students are expected to conduct themselves in a professional manner in attitude, dress and behavior in all laboratory settings. This course requirement prepares students for actual workplace skills and attitudes. Since laboratories simulate workplace situations, students are expected to dress in a manner that will promote respect and confidence from others. Students are required to wear appropriate dress to lab. Appropriate dress may be professional, business-like dress or skirt and blouse or shirt, or jeans or slacks and a professional business-like shirt or blouse. A clean smock must be worn over street clothing. For all laboratory sections of VT 131, VT 237, VT 246 and VT 276, students may choose to wear a coordinated scrub top and scrub pants. Due to safety considerations, students must wear enclosed (not open-toed) style shoes with a non-skid sole in the above labs. All clothing must be clean and in a state of good repair. The instructor reserves the right to decide when clothing is inappropriate and may ask students not to wear particular outfits to lab again, or the instructor may dismiss students to go home and change. Students are responsible for making up any missed laboratory work that is incurred by such a request to change clothing.

Students are required to attend all lecture and laboratory sessions as described in the Attendance Policy section of the syllabus.

If students check out equipment (such as CDs, Videotapes, Sutures boards, etc) to be used for instructional purposes in this class, they must fill out the appropriate Equipment Loan Agreement form. Failure to return the equipment in a timely manner will obligate the student to pay the price of the equipment value as stated on the Equipment Loan Agreement form. A hold will be placed on the student's grades, transcripts and diploma until the college is reimbursed for the cost of the equipment or the equipment is returned.

Use of cell phones during class is prohibited (lecture/lab). Cell phones must be turned off prior to class and remain off during class time.

Students are required to submit two newsletter articles for *Pawprints and Hoofbeats* as described in the handout, "Newsletter Writing Guidelines."

Students are required to provide routine care and treatment for assigned animals as described in the handout, “Sophomore Animal Care Project.”

### **Sophomore Animal Care Requirements**

Sophomore Veterinary Technology students are required to provide medical treatment as prescribed by the attending veterinarian and to provide routine wellness care to program owned animals. The purpose of this assignment is to provide students with the opportunity to practice patient management, treatment and wellness care and to provide facility-owned animals with responsible, consistent care and attention.

Students are assigned in teams of two to CCC-owned dogs, cats and laboratory animals. Occasionally, a single student may be given responsibility for an animal. It is expected that both team members will be involved in every animal’s care that is assigned to the team. It is not acceptable for student team members to divide the work load by assuming responsibility for a single animal.

Students will complete the following tasks for each animal upon the animal’s arrival at the premises

- A physical examination noting all abnormalities on the exam form
- A bath
- Application of appropriate external parasiticide as prescribed by the attending veterinarian
- Weigh and take temperature
- Laboratory workups. This will include a CBC, U/A, heartworm testing as appropriate, Feline Leukemia testing as appropriate, and fecal flotation and a direct smear. Before proceeding with any lab work, the students should obtain clearance from the Clinical Pathology instructor.

Initial laboratory data not associated with a medical problem should be recorded on a separate SOAP sheet and placed at the front of the SOAP pages.

Any medical problem is to be reported immediately in person to the attending veterinarian, who will prescribe an appropriate treatment regime to be carried out by the student. Examples of medical problems include, but are not limited to, hair loss, ear mites, sneezing, parasite ova, fleas, discharges, diarrhea, and vomiting.

Students will also keep complete medical records on the animal in the SOAP format beginning at the time of arrival and continuing throughout the animal’s stay. The correct order for the medical records is

- Summary sheet—goldenrod
- Lab sheet—yellow
- Problem list—green
- Surgery report—white (in the event of surgery)
- PE form—blue
- SOAP records—white
- Anesthesia forms—pink (in the event of anesthetic event)
- 2 week checklist—salmon

When the veterinarian orders a diagnostic test or prescribes treatment, the student will enter the order in the medical record in the proper format and show the written order immediately to the veterinarian for review. The veterinarian will initial the order as confirmation of its accuracy. All treatments are to be carried out as prescribed and correctly recorded in the medical record. At the end of the treatment period, the students will again show the medical record to the veterinarian to confirm its accuracy. All requested diagnostic test information must be properly recorded in the medical record before showing it to the veterinarian.

In addition, students must also keep computerized records of the medical history using the Avimark Program. This will allow the student to practice using the computerized veterinary medical record program that is introduced in the course Veterinary Office Procedures and Computer Skills. The purpose of this record is to provide adoptive owners with a printout of pertinent medical information at the time of adoption, including vaccination and spay/ neuter certificates. These records must be updated periodically during the semester and fully completed before the animal is removed from the premises at the end of the semester. All pertinent medical

history should be summarized. For example, a comment such as “Amoxicillin 200 mg b.i.d. for 7 days” is appropriate. It is not necessary to record in the medical history every day that an antibiotic was given. The computerized medical history must be as complete in its summary as the written history.

Animals are to receive a bath (for dogs) or be brushed (for cats) at weekly intervals including nail trims and anal sac expression. Students are required to properly clean up all facilities and equipment after use.

Animals are to be weighed and temped weekly and the results recorded on the summary sheet.

Animals must receive a brief physical exam daily sufficient to insure that the animal is responding appropriately to treatment and that no new medical problems have developed. Animals must receive a full physical exam weekly with results recorded in the medical record. Communication between team members should be sufficient to allow both members to make a full report on all medical problems to the veterinarian.

In the event an animal requires emergency care, additional students may be assigned to the case. These students assume responsibility for the patient’s care until it is released by the veterinarian. Participating students must report to both the assigned sophomore students and the veterinarian. The students originally assigned to the animal’s care and those who are required to observe the animal daily must contact the veterinarian within 24 hours following the initiation of emergency care treatment.

The two week checklist provides a format to document appropriate examinations and that wellness care is taking place. It is expected that the checklist requirement be completed daily and that the completed checklist be submitted on time as assigned. The signature of both team members is a confirmation that the work was done and the information accurate. Both team members will responsible for the accurate completion and timely submission of the report.

As a required assignment, past due two week checklists are not acceptable. If the checklist is not submitted on time or is not up-to-date and present in the animal’s medical record, the students responsible will be assigned to a facility clean up team, with work to be scheduled at the instructor’s convenience and completion of the work to be verified by the instructor before the students’ release.

Communication problems between team members should be reported to the attending veterinarian who will attempt to mediate the situation. Teamwork and communication skills are valued highly in the workplace and are, therefore, emphasized in this project.

Medical records must be complete and accurate. If a student’s medical record keeping is found at any time to be inadequate punitive action may be taken.

Students are required to purchase a minimum of two ultrafine Sharpie markers and have these markers in the possession during laboratories for the purpose of recording keeping on medication vials, labeling syringes, and other labeling which requires a permanent marking pen.

## **Assignment Policy**

Written assignments or projects are expected to be done on or before the due date. Past due assignments will not be accepted.

## **Test Policy**

Tests are scheduled to be given only during class time. If students are going to be absent, they must notify the instructor in advance and reschedule a time to make up the test. Tests must be rescheduled within a reasonable time frame (one to two days unless there are extreme extenuating circumstances). The test must be taken at the rescheduled time. After the instructor has graded and returned the test to the class, no make up is possible.

No quizzes will be made up unless students’ absence is due to illness or other excused absence (see definition of excused under Attendance Policy). Rescheduling for make-up quizzes is subject to the same guidelines as those

for major tests. In the case of illness, it is the students' responsibility to contact the instructor to check and see if a quiz was given before the next class period begins. Pop quizzes will be given whenever the instructor wishes. If a quiz is given at the beginning of class and students are late, they will not be able to make up the quiz.

## **Attendance Policy**

Each student is allowed two excused absences from lab. (Excused means a letter from nurse, a phone call prior to lab left on the instructor's voicemail to verify time, or an arrangement made with the instructor at least one week in advance.) No messages carried by peers will be accepted. Arrangements must be done by the student taking the excused absence. After two excused absences, the student will make up four hours of lab time for each additional two hours of excused absences.

An unexcused lab cut results in one week of duty (floors, ward care or wherever help is needed) that will be assigned by instructor. In addition, for each two-hour lab that is unexcused, the student will make up four hours of lab time.

Attendance at the lecture portion of the classes is vital to the acquisition of workplace skills; therefore, attendance at lecture classes is required. Quizzes will be given at the beginning of the class period on a daily or random basis. No make up will be allowed for those students not in attendance. If a student is absent for more than four lecture periods per eight weeks, then the grade for the class will automatically be dropped one letter grade. Absences due to extenuating circumstances will be reviewed by the program staff and adjustments made where merited.

Because attendance in lab and lecture is vital to the acquisition of workplace competencies, students are expected to be on time for all scheduled lectures and laboratory classes. On time is defined as in the classroom and prepared to do coursework at the scheduled starting time. Any time other than on time is late. Students choosing to arrive late are responsible for checking with the instructor for announcements, assignments or notes they may have missed. In addition, late students may not be permitted to make up quizzes and/or will not be granted additional quiz or exam time beyond that scheduled in class.

## **Academic Integrity**

Colby Community College defines academic integrity as learning that leads to the development of knowledge and/or skills without any form of cheating or plagiarism. This learning requires respect for Colby's institutional values of quality, service and integrity. All Colby Community College students, faculty, staff, and administrators are responsible for upholding academic integrity.

**Cheating** is giving, receiving, or using unauthorized help on individual and group academic exercises such as papers, quizzes, tests, and presentations through any delivery system in any learning environment. This includes impersonating another student, sharing content without authorization, fabricating data, and altering academic documents, including records, with or without the use of personal and college electronic devices.

**Plagiarism** is representing or turning in someone else's work without proper citation of the source. This includes unacknowledged paraphrase, quotation, or complete use of someone else's work in any form. It also includes citing work that is not used and taking credit for a group project without contributing to it.

The following procedure will be used for students who violate the policy:

- First Offense – Student will receive a zero for the assignment and the student will be reported to the Dean of Academic Affairs.
- Second Offense – The student will be reported to the Dean of Academic Affairs and removed from the class.
- Third Offense – The student will be reported to the Dean of Academic Affairs and dismissed from the college.

Any questions about this policy may be referred to the Dean of Academic Affairs.

## **Assessment**

Colby Community College assesses student learning at several levels: general education, program, and course. The goal of these assessment activities is to improve student learning. As a student in this course, you will participate in various assessment activities. An example of your work, a paper, some test questions, a presentation, or other work may be selected for assessment. This process will not affect your grade, will not require you do additional work, and your evaluation will be confidentially handled. Results of these activities will be used to improve teaching and learning at Colby Community College.

## **Syllabus Information Disclaimer**

The instructor reserves the right to change any information contained in this document, when necessary, with adequate notice given to the students. Notice shall be given in the classroom during class. No other notice is required. It is the students' responsibility to stay current with any changes, modifications, adjustments or amendments that are made to this document.

## **Accommodations for Students with Disabilities**

According to the Americans with Disabilities Act, it is the responsibility of each student with a disability to notify the college of his/her disability and to request accommodation. If a member of the class has a documented learning disability or a physical disability and needs special accommodations, he/she should contact Student Support Services, which is located in the Student Union.

## **Equipment**

Equipment used in this course is located in the Veterinary Technology laboratory. A list of all equipment available and required is published and may be found in the laboratory.

## **Bibliography**

None

## **Recommended Resources**

None