Discipline: Agriculture	Sub-discipline: Veterinary Technician
General Course Title: **Veterinary Equipment, Operation, Instrumentation & Safety**	Min. Units: **3 Semester**
	Proposed Suffix:

Course Description:
Introduction to diagnostic imaging equipment used in veterinary practices. Safe operation of radiographic equipment. Developing, trouble-shooting and reading radiographs. Uses of ultra-sound equipment. Using gas anesthesia equipment-safety and proper procedure.

Required Prerequisites or Co-Requisites[1]

Advisories/Recommended Preparation[2]

Course Objectives: *At the conclusion of this course, the student should be able to:*

- Prepare and use appropriate technique charts.
- Implement radiation-safety precautions.
- Obtain diagnostic radiographs of the thorax, abdomen, extremities, axial skeleton, dental arcade and pelvis.
- Perform or assist with radiographic procedures requiring contrast media.
- Process exposed radiographic film using manual techniques and automatic processors.
- Label and file radiographs as legally required.
- Perform or assist in using diagnostic ultrasound procedures.
- Prepare and check gas anesthesia machine for safe operation for patient and operator.
- Determine the proper administration system and calculate appropriate flow rates.
- Administer the anesthetic agent correctly.

Course Content:

1. Procedures basic to preparing a technique chart
   a. Protect against hazards of exposure
   b. kVp and mAs
   c. Table-top and grid requirements
   d. Film types and exposure factors
   e. Machine factors affecting exposure and radiographic detail
   f. Patient conditions affecting exposure factors

2. Radiation safety precautions
   a. California Radiation Control Regulations and Radiation Safety in Veterinary Practice (relevant sections)
   b. Radiation monitoring devices
   c. Protective equipment
   d. Mechanical and chemical restraints for patients
   e. Collimators
   f. Storage of protective equipment

Veterinary Equipment, Operation, Instrumentation & Safety
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3. Obtaining diagnostic radiographs
   a. Measurement of patient
   b. Positioning patient

[1] Prerequisite or co-requisite course need to be validated at the CCC level in accordance with Title 5 regulations; co-requisites for CCCs are the linked courses that must be taken at the same time as the primary or target course.

[2] Advisories or recommended preparation will not require validation but are recommendations to be considered by the student prior to enrolling.

c. Heel effect
d. Time of exposure

4. Radiographic procedures requiring contrast media
   a. Procedures requiring contrast media
   b. Contrast agents and equipment
   c. Mechanics of common procedures
      i. Gastrointestinal series
      ii. Esophograms
      iii. Intravenous pyleograms
      iv. Cystograms
      v. Myelograms
   d. Minimizing patient risks
   e. Patient preparation

5. Manual processing of radiographic films
   a. "Time-temperature" method
   b. Avoiding artifacts
   c. Problem-solving effects
      1) Developer too weak/strong
      2) Fixer too weak/strong
      3) Time in developer
      4) Time in fixer
      5) Deviations in developer temperature
      6) Inadequate washing

6. Automatic processing of radiographs
   a. Developing temperatures
   b. Radiographic artifacts
   c. Problem solving

7. Labeling and filing radiographs
   a. Indicating right or left using radiographic markers
   b. Indicating position
   c. Veterinary facility
   d. Filing and storing
8. Diagnostic ultrasound procedures
   a. Patient prep
   b. Ultrasound principles
   c. Restraint
   d. Hazards of ultrasound exposure
   e. Labeling

Veterinary Equipment, Operation, Instrumentation & Safety (Content Continued)

9. Gas Anesthesia
   a. Anesthetic agents and their properties
   b. Anesthetic machine preparation and safe operation
   c. Administration systems
      1) Semi-closed
      2) Closed
      3) Semi-open
      4) Open

Laboratory Activities: Individual Laboratory Activities are designed to support course objectives.

Methods of Evaluation: Lecture	Methods of Evaluation: Laboratory
Comprehensive Quizzes and Exams Written Critical Thinking Scenarios Problem Analysis and Solution Research and Term Papers	Laboratory Skill Validation by Observation Laboratory Reports Diagnoses and Problem Solving Laboratory Skill Practicum Certification Exams

Typical Textbooks, Manuals, or Other Support Materials

Practical Diagnostic Imaging for the Veterinary Technician, 3rd Edition, Han, Connie M., and Hurd, Cheryl D., Elsevier Mosby, 2000.

Clinical Textbook for Veterinary Technicians, 4th Edition, McCurnin, Dennis M., D.V.M.M.S., W.B. Saunders, 1998

Small Animal Diagnostic Ultrasound, 2nd Edition, Nyland, Thomas G., D.V.M., and Matton, John S., D.V.M., Saunders, 2002

Statewide Articulation: Under review

FDRG Lead Signature: Date:

Mark E. Bender, PhD CSU Stanislaus

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