

Course discipline/number/title: VT 1610: Diagnostic Imaging

A. CATALOG DESCRIPTION

1. Credits: 3
2. Hours/Week: 1 lecture, 4 lab
3. Prerequisites (Course discipline/number): VT 1410, VT 1710, VT 1810, and VT 2900
4. Other requirements: All prior veterinary technician courses should be completed with a grade of C or better.
5. MnTC Goals (if any): NA

B. COURSE DESCRIPTION: This is a lecture and laboratory course covering the practical and theoretical aspects of diagnostic imaging in veterinary medicine. This course covers basic principles of x-ray physics, radiation safety, radiographic equipment and accessories, patient positioning, and legal requirements. The course will also include practical application of proper positioning to obtain diagnostic quality radiographs. In addition to routine radiography, the following topics will be included: trouble shooting radiographic quality, use of contrast media, sonography, dental radiography, special imaging techniques and development of a radiographic technique charts.

C. DATE LAST REVISED (Month, year): December, 2023

D. OUTLINE OF MAJOR CONTENT AREAS:

1. Radiation Safety
 - a) Protection
 - b) Standard precaution procedures
 - c) Recognizing faulty equipment operations
 - d) Radiation monitoring devices
2. Laws Regulating Veterinary Medical Imaging
 - a) Quality Assurance
 - b) Quality control
 - c) X-ray records and filing and storing
 - d) Film identification
3. Principles of Imaging
 - a) Physics of X-ray generation
 - b) Terminology
 - c) History
 - d) Techniques charts
4. Function and Anatomy of X-ray Machines
 - a) X-ray tube anatomy
 - b) Stationary machines
 - c) Portable machines
 - d) Dental machines
 - e) Digital Equipment
 - f) Cleaning and maintenance
 - g) Instrument controls
 - h) Exposure variables
5. Positioning of patients
 - a) Terminology
 - b) Positioning aids
 - c) Soft tissues
 - d) Thoracic limb
 - e) Pelvic limb (including OFA applications/positioning)
 - f) Skull
 - g) Spine
 - h) Large animal
 - i) Avian and Exotics
 - j) Dental radiography
6. Radiographic Quality

D. OUTLINE OF MAJOR CONTENT AREAS: Continued. . .

- a) Density
 - b) Contrast
 - c) Detail
 - d) Distortion
 - e) Exposure
 - f) Techniques charts
7. Special Diagnostic Imaging
- a) Ultrasound
 - b) Contrast studies
 - c) MRI
 - d) CT
 - e) Nuclear Medicine

E. LEARNING OUTCOMES (GENERAL): The student will be able to:

1. Demonstrate an understanding of basic radiographic theory and terminology.
2. Demonstrate radiation safety while taking quality diagnostic radiographs of canines, felines, and equines using general principles of animal positioning and radiographic technique charts.
3. Demonstrate use of stationary, dental, and portable radiographic machines and digital equipment.
4. Understand and perform routine contrast media studies.
5. Explain how technical artifacts are generated and demonstrate how they are prevented when taking radiographs.
6. Demonstrate proper use of radiographic logs, reports, files, and records.
7. Demonstrate proper use and maintenance of imaging equipment.
8. Identify concepts and terms relating to exposure and control factors, such as density, contrast, exposure equations, directional terms, and critique points of radiographs.
9. Demonstrate quality control tests required by state regulatory agencies.
10. Understand alternatives to radiography such as CT, Nuclear Medicine, Magnetic Resonance Imaging, Ultrasonography, Endoscopy, and Radiation Therapy.
11. Demonstrate an understanding of the modifications of diagnostic imaging techniques as they apply to mice or rats, guinea pigs, lizards, and amphibians

F. LEARNING OUTCOMES (MNTC): NA

G. METHODS FOR EVALUATION OF STUDENT LEARNING: Methods may include but are not limited to:

1. Written tests and/or quizzes
2. Laboratory practical tests
3. Course assignments
4. Group work/projects
5. Participation (especially laboratory)

H. RCTC CORE OUTCOME(S). This course contributes to meeting the following RCTC Core Outcome(s):
Critical Thinking. Students will think systematically and explore information thoroughly before accepting or formulating a position or conclusion.

I. SPECIAL INFORMATION (if any):

The initial lab session explains and familiarizes the student with general safety hazards and safety equipment to the lab. During the pre- lab discussion, the hazardous characteristics of any materials used during a lab are discussed. In addition, if the lab involves any potentially infectious or zoonotic material, the students will be instructed on the proper use and disposal. The instructor will direct all students to where necessary protective equipment while working with any hazardous chemicals. A copy of Material Safety Data Sheets for chemicals used is available in the lab.