Veterinary Health Center
MANHATTAN, KANSAS

OFFICIAL PROTOCOL

DIAGNOSTIC IMAGING AND RADIOLOGY

OBJECTIVES

1. Develop sound radiation safety practices.
2. Produce diagnostic radiographic studies and assess image quality.
3. Develop a routine for systematic description and interpretation of images using Roentgen signs and communicate radiographic findings.
4. Understand the basic physics of diagnostic ultrasound and machine operation. Gain foundational ultrasound acquisition and interpretive skills.
5. Understand indications for contrast procedures and alternative imaging modalities available to veterinary medicine.

SCHEDULE

Students are expected to arrive at the Radiology section at 8:00 A.M. Lunch periods are scheduled by the technologists and faculty depending on caseload and daily schedule.

Students will attend rounds from 8:00 A.M. – 10:00A.M. Monday-Thursday and 9:00 A.M. Friday unless specified otherwise. On Tuesdays (with certain exceptions), rounds will take place from 8:30A.M. – 10:30A.M. due to house officer seminars.

Students are assigned to different imaging duties, on a rotating basis. Students should be available in person (and by paging system) until the diagnostic imaging appointments are completed for the day.

Students will have afternoon (4:00P.M.-5:00P.M.) rounds to evaluate pertinent clinical cases when clinical case load allows or topic rounds. Students will present cases and follow up information during these rounds sessions.

During non-busy times, students will be expected to review imaging literature, VCS 845 notes and lecture and lab PPT's, and listen to residents' interpretations of clinical cases. Students should remain available in the event clinical patients present.

ATTENDANCE

Diagnostic Imaging (Radiology) requires that a minimum of 13 contact days must be completed, no more than 2 days can be missed. If a student is out 3 days, 1 day must be made up; 4 days out will require the rotation to be rescheduled.

DRESS CODE

Students are expected to be dressed appropriately to be able to perform physical tasks related to diagnostic imaging. Whilst client interaction is not common during the radiology rotation, you may encounter clients, especially when doing large animal radiographs and as such barn appropriate professional attire is expected. No hats, gym wear or open toed shoes are allowed. Scrubs are encouraged.

RADIATION SAFETY

IMPORTANT!!! Pregnant students are not allowed to work near devices which emit ionizing radiation. Pregnant students and students suspecting themselves of being pregnant must communicate this in writing/via email to one of the radiologists and Department Office (prior to starting the rotation) so that non-hazardous responsibilities within the section can be assigned.

1. A radiation dosimeter is issued to each student at the beginning of the block. It must be worn on the outside of the protective apron, at collar level. Badges are worn right-side out. The badges may only be taken from the building on ambulatory or other duties related to the VHC. Please do not launder badges!
2. Radiation-attenuating aprons, gloves and lead glasses must be worn by persons in the room when an exposure is made or fluoroscopy is in use. Gloves/gowns are damaged when folded or bitten. Hang after use. Do not use as protection from scratches/bites.
3. **STAY OUT OF THE PRIMARY BEAM!!! PROTECTIVE GARMENTS WILL NOT PROTECT YOU.** Stand as far from the animal as possible when restraining it for an exposure and collimate the beam as much as possible. Use cassette holders for large animal radiography**. THE BEST EXPOSURE IS NO EXPOSURE.** As few people as possible should be used to restrain an animal. Animal restraint devices (tape, sedation, etc.) should be used whenever possible. Think out the procedure carefully to minimize retakes and double-check each other's setup(s). **Do not hesitate to discuss the need for sedation with the radiology veterinary technician or radiologist if the animal shows indications of being difficult to restrain.**

MRI SAFETY

All students must complete the MRI safety training. Students are allowed in the MRI control room on a limited basis with permission from faculty or the MRI technician. Students are **NOT** allowed in the magnet room under any circumstances.

CLINICAL RESPONSIBILITIES

1. **Main Room, Back Room, and Large Animal Room Radiography**
    A. Review the clinical history of the patient and be aware of possible complications (oxygen dependent or aggressive, etc.)

    B. Obtain diagnostic quality radiographs as requested for the clinical patients.
        1. Check schedule and ensure patients are imaged on time.
        2. Contact Radiologist or Technologist on case when problems arise (sedation needed, case delayed due to emergency, etc.)

C. Determine correct positioning for requested study.
   1. Position animals for exposure.

D. Evaluate quality of radiographic study with the radiology technologist, resident, or radiologist and discuss case to see if additional views will be needed before releasing animal from radiology.

E. Understand the indications for radiography for that case, properly interpret the films independent of the radiologist and be able to discuss your findings.

F. Make sure workspace in rooms are clean and clutter free after each patient.

2. Reading room/interpretation

A. Students will observe and participate in the discussion and reporting of clinical cases.

B. Students will present cases and follow-up in the afternoon rounds sessions.

C. Participate/observe in any special procedures

3. Ultrasonography

A. Hands on ultrasound is available as a lab during the first week of the rotation. Student owned dogs are used for these labs and this will be confirmed and finalized prior to the lab.

B. Check schedule, page clinician and responsible student for patients and have patients ready in ultrasound room to be imaged at their appointed time(s).

C. Ensure a charge is entered into Instinct for each patient upon completion of the ultrasound study.

D. Make sure workspace is clean and clutter free after each patient.

E. Follow up on all cases of the day (cytology results and surgical outcome, etc.)

Grading

1. Students are expected to follow the Honor System of the College of Veterinary Medicine. Possession of KSU VCS 900 examination or rounds rubrics from previous rotations/academic years is prohibited. Students that encounter such material should report that information to the course coordinator immediately. Failure to report this is a violation of the honor code. Violation of course policies related to academic honesty will result in a final D grade.

2. Grades are based upon professionalism, participation in rounds (quizzes in rounds), technical proficiency, clinical skills, anatomy quiz, physics take-home assignment and a final examination

of radiographic interpretation. Point contributions of these criteria towards the final grade are outlined on the next page.

3. There will be a quiz following each morning topic round. This will be a closed book quiz where you will be expected to write a radiographic report on a case based on the topic rounds covered that morning. The top five out of six grades for these will count. You have to be present in rounds in order to be eligible to take the quiz. Excused absences will be dealt with on a case by case basis at the discretion of the faculty on clinic duty on the day of the rounds.

4. The final examination is given from 8-10:15 a.m. in the morning two days prior to the last workweek day of the block (i.e. on Wednesday morning if the block ends on Friday). During rotations that include a holiday, arrangements will be made and notification given at the start of the rotation as to what day the examination is scheduled for. The exam is comprised of radiographs from clinical cases to be interpreted. Students must work independently, in a locked down browser and the examination is NOT "open-book."

5. The anatomy and final examination scores must be at least 70% to achieve a passing grade for the rotation. If less than 70% is achieved on the anatomy or final exam, a single re-examination will be given on the following day (similar format or oral examination at the faculty discretion). The recorded final examination grade will be 70% even if the student scores higher on the reexamination. Scoring less than 70% on the re-examination in either the anatomy or final examination will result in a **D** grade for the rotation.

SENIOR RADIOLOGY TOPIC ROUNDS

Week	Monday	Tuesday	Wednesday	Thursday	Friday
1	Orientation	Anatomy Quiz Film Interpretation	Ultrasound Lab	Ultrasound Lab	Large animal Lab Take home physics and proficiency due
2	Thoracic Radiology	Thoracic Radiology	Abdomen Radiology	Abdomen Radiology	Technical Topic
3	Orthopedic Radiology	Orthopedic Radiology	Exam 8:00 – 10:00 a.m.	Open	Technician Topic

8:00 a.m. – 10h00 (in the conference room): (Monday, Tuesday, Wednesday, Thursday) Topic rounds, tests, etc. as listed in the above chart
8:00-10:00 a.m. (in the reading room): Resident rounds to review films from the previous day

The group will be split in 2 for the ultrasound lab rounds. The first day, half the group will do hands-on ultrasound while the remaining students use this time for review of the cases in the conference room. The groups will switch for the second day. Student owned dogs are typically used for these labs and we will arrange an appropriate dog to use for each group on the first Monday of the rotation. There is no cost to the student to have their canine pet participate in this lab.

Daily Objectives:

You are required to know normal anatomy as covered in previous courses. The notes from the radiology course and chapters in Thrall should be reviewed prior to morning topic rounds. The sophomore radiology lab material that is available in the computer lab and in the Canvas clinical page and forms excellent review material. In addition, knowledge from medicine, surgery, pathology, histology and physiology is required to apply to cases on an integrated basis.

You are required to review the radiology notes and PPTs prior to the exam the third week.
If there are any questions regarding this material, please ask the radiologist or resident on duty.

Recommended References:

1. VCS 845 lecture notes, PPTs and Labs
2. Veterinary Diagnostic Radiology (Thrall)
3. BSAVA Manual of Canine and Feline Radiography and Radiology: A Foundation Manual
4. (Editors: Andrew Holloway, Fraser McConnell)
5. BSAVA Manual of Canine and Feline Abdominal Imaging (Editors: Robert O'Brien, Frances Barr
6. BSAVA Manual of Canine and Feline Musculoskeletal Imaging (Editors: Robert Kirberger, Fintan McEvoy)
7. BSAVA Manual of Canine and Feline Thoracic Imaging (Editors: Tobias Schwarz, Victoria Johnson)
8. BSAVA Manual of Canine and Feline Ultrasonography (Editors: Frances Barr, Lorrie Gaschen)

Conference room is to be cleaned each Friday. Please ensure the fridge is also cleaned and devoid of food or beverage that will spoil.

RADIOLOGY STUDENT GRADE EVALUATION FORMS

VCS 900 Clinical Radiology **Student:**
Grading Rubric **Rotation:**

Knowledge (60 points)	Comments	Score
• Anatomy Quiz (10 points)		
• Rounds Cases (15 points)		
• Take Home Quiz (5 points)		
• Final Exam (30 points)		

Skills (25 points)		Score
• Thoracic Radiograph check-off (5 points)	Check-off completed with technician during weeks 2 or 3	
• Abdominal Radiograph check-off (5 points)	Check-off completed with technician during weeks 2 or 3	
• MSK Radiograph check-off (5 points)	Check-off completed with technician during weeks 2 or 3	
• Subjective (10 points)	Anatomy, positioning, technique, safety	

Professionalism (15 points)		Score
• Subjective (15 points)	Participation, teamwork, patient care, case involvement, follow-up, communication. Students on "reading room/interpretation" and on "ultrasound" will be asked to present 1-2 cases from the day in the afternoon rounds session. Case knowledge, follow-up, and communication skills will contribute toward the Professionalism score.	

Comments:	

Clinical Skills Check-off Form

Student: **Rotation:**

Thoracic Exam Patient Name/ID:

Patient Safety		
Radiation Safety		
Identify anatomy and correct positioning		
Correct Marker		
Exposure settings		
Artifacts Identified/Corrected		
Collimation		
Correct Hanging Protocol		
Evaluate Image Quality		

Tech Initial & Date:

Abdominal Exam Patient Name/ID:

Patient Safety		
Radiation Safety		
Identify anatomy and correct positioning		
Correct Marker		
Exposure settings		
Artifacts Identified/Corrected		
Collimation		
Correct Hanging Protocol		
Evaluate Image Quality		

Tech Initial & Date:

MSK Exam Patient Name/ID:

Patient Safety		
Radiation Safety		
Identify anatomy and correct positioning		
Correct Marker		
Exposure settings		
Artifacts Identified/Corrected		
Collimation		
Correct Hanging Protocol		
Evaluate Image Quality		

Tech Initial & Date: