



RAD-525: RADIOLOGY EXTERNSHIP

Effective Term

Fall 2024

BOT Approval Date

12/14/2023

Discipline

RAD - Radiologic Technology

Course Number

525

Course Title

Radiology Externship

Short Title

Radiology Externship

Credit Status (CB 04)

D - Credit - Degree applicable

Units**Lecture Units**

2.00

Lab Units

5.00

Total Units

7.00

Hours**Lecture Contact Hours**

32-36

Out of Class Hours Lecture

64-72

Lab Contact Hours

240-270

Out of Class Hours Lab

0.00

Total Contact Hours

272 - 306

Total Out of Class Hours

64 - 72

Total Student Learning Hours

336 - 378

Is this an existing Extensive Lab?

No

**Do you want to propose this for Extensive Lab?**

No

Distance Education

No

Catalog Description

This course provides supervised training in an approved clinical affiliate. Lecture topics in this course provide an introduction to specialized imaging exams to include fluoroscopy, hysterosalpingography, pediatrics, orthoroentgenography, mammography, arthrography, and myelography.

Attach Supporting Documents

ASRT 2022 radiography curriculum guide.pdf
JRCERT 2021 Radiography Standards pg 28.pdf

Attach Supporting Documents

LMI.pdf

Requisites**Pre or corequisite(s)****Prerequisite or corequisite(s) (must be taken simultaneously if not taken before)**

RAD-510 (with a grade of C or better)

and RAD-515 (with a grade of C or better)

and RAD-520 (with a grade of C or better).

Codes**TOP Code (CB 03)**

1225.00* - *Radiologic Technology

CIP Code

51.0911 - Radiologic Technology/Science - Radiographer.

Student Accountability Model (SAM) Priority Code (CB 09)

C - Clearly Occupational

Noncredit Category (CB 22)

Y - Credit Course

Repeatability Code

No

Grading Option

Letter grade OR P/NP

Minimum Qualifications

Minimum Qualifications	And/Or
Radiological Technology	End

CSU Area(s)

IGETC Area(s)

Learning Objectives

Learning Objectives

Learning Objective
1. Analyze fluoroscopy system components and functions in regard to imaging and patient exposure.
2. Select the appropriate radiation protection techniques for the fluoroscopy operator and patient.
3. Evaluate fluoroscopic regulations.
4. Explain the use of digital imaging and communications in medicine.
5. Evaluate security of patient information and access to patient information using computers in radiology.
6. Compare pediatric anatomy and imaging to adult anatomy and imaging.
7. Illustrate the basic concepts of hysterosalpingography, orthoroengenography, bone density, sialography, mammography, arthrography, and myelography procedures.
8. Apply safety procedures when transporting patients to and from the radiography procedure room.
9. Apply basic patient care techniques with sensitivity to the diverse needs of patients of different genders, races, cultures, and disabilities during radiographic procedures. Apply basic patient care techniques to a diverse population of patients during radiographic procedures.
10. Apply radiology techniques to produce diagnostic quality radiographs under direct supervision.
11. Apply radiation protection concepts to self and patient during a radiographic procedure.

Learning Outcome Information

Course Learning Outcomes

Learning Outcome
1. Students will understand and apply fluoroscopic operations in regard to patient and radiographer protection against unnecessary exposure.
2. Students will safely transport patients to and from the radiography department by gurney and wheelchair.
3. Students will follow instructions from certified Radiologic Technologists and certified Radiologists during clinical training.

Program Learning Outcomes

Learning Outcome
Apply positioning skills in all required radiographic examinations.
Select appropriate technical factors for radiographic examinations.
Practice radiation protection for all radiographic examinations.
Employ proper patient care techniques and effectively provide care for patients from diverse groups/populations.
Demonstrate oral and written communication skills.
Relate to and anticipate the needs of the doctors and technologists.
Adjust to changes, situations, patient conditions, updated evidence-based practice, and deviation from the normal routine.
Demonstrate knowledge of ethical requirements for an entry level radiographer along with ethical practices in a healthcare setting.
Understand professional obligations upon gaining the ARRT status.

Institutional Learning Outcomes

Aesthetic Awareness: The student will identify and evaluate how aesthetic expression leads to an appreciation of social and cultural context as well as the values of art and nature.

Communication: The student will effectively express and exchange ideas through listening, speaking, reading, writing, visual works, and other modes of interpersonal expression.

Critical Thinking: The student will analyze problems, gather and synthesize relevant information, evaluate ideas, information, and evaluate alternative points of view to create, innovate and implement effective solutions.

Cultural Awareness and Humility: The student will demonstrate knowledge of and sensitivity toward individuals of diverse ethnicity, age, gender, sexual orientation, and religious affiliations, as well as toward those individuals with diverse abilities and socio-economic classes to respectfully interact with individuals of diverse perspectives, beliefs and values while being mindful of the limitation of their own cultural frameworks.

Information and Technology Literacy: The student will access, interpret, evaluate, and apply relevant information sources and digital media effectively, and in an ethical and legal manner.

Scientific Awareness: The student will apply the scientific method of inquiry to assess potential solutions for real-life challenges by employing science-based knowledge and methodologies in daily life.

Social Awareness: The student will recognize and analyze the interconnectedness of global, national, and local concerns, analyzing cultural, political, social, and environmental issues from multiple perspectives and appreciate similarities and differences among cultures.

Civic

Personal

and Professional Responsibility

Content

Course Lecture Content

1. Fluoroscopic Applications
 - a. History
 - b. Components
 - c. Purpose and function of components
 - d. Radiation safety
2. Computers in Radiology
 - a. Patient information and systems scheduling
 - b. Picture archiving and communications systems (PACS)
 - c. Hospital information systems (HIS)
 - d. Radiology information systems (RIS)
 - e. Digital Imaging and communications in medicine (DICOM)
3. Hysterosalpingography
 - a. Anatomy and physiology
 - b. Indications/Contraindications
 - c. Imaging procedures
 - d. Patient communication
 - i. History
 - ii. Last known menstrual cycle
 - iii. Race, culture, disability considerations
 - iv. Pregnancy evaluation, 10 day rule
 - v. Post exam instructions
4. Orthoroengenography
 - a. Bone physiology
 - b. Imaging procedures
 - i. Patient preparation
 - ii. History
 - iii. Patient communication
 - iv. Race, culture, disability considerations
5. Bone Density
 - a. Imaging procedures
 - b. Indications/Contraindications
 - c. Interpretation of results
6. Mammography
 - a. Anatomy and physiology
 - b. Imaging procedures
 - i. Patient prep instructions
 - ii. History
 - iii. Patient communication
 - iv. Culture, race, gender, disability considerations of patients
 - c. Image evaluation critique

- d. Radiation protection
- e. New technical advances
- 7. Pediatric Radiography
 - a. Anatomy considerations
 - b. Radiation protection considerations
 - c. Restraining and positioning devices
 - d. Non-accidental trauma reporting practices
 - e. Pediatric diagnostic indications for various exams
 - f. Image critique related to pathology terms and radiographic positioning
 - g. Pre-exam preparation
- 8. Myelography
 - a. Anatomy and physiology
 - b. Indications/Contraindications
 - c. Imaging procedures
 - i. Patient prep
 - ii. Patient communication
 - iii. Patient prep instructions
 - iv. History
 - v. Culture, race, gender, disability considerations of patients
- 9. Arthrography
 - a. Anatomy and physiology
 - b. Indications/Contraindications
 - c. Imaging procedures
 - i. Patient prep
 - ii. Patient communication
 - iii. Patient prep instructions
 - iv. History
 - v. Culture, race, gender, disability considerations of patients
 - vi. Post exam instructions

Course Lab Content

- 1. Transportation of patients
 - a. Wheelchair to radiography table and back
 - b. Gurney to radiography table and back
- 2. Department Policies and Procedures
 - a. Hospital employee orientation
 - i. Fire drill
 - ii. Codes
 - iii. Emergency procedures
 - iv. Patient privacy policies (Health Insurance Portability and Accountability Act)
 - b. Dress code
 - c. Magnetic resonance imaging orientation and safety
- 3. MSJC policy and procedures
 - a. Time logs
 - b. Exam logs
 - c. Direct and indirect supervision
 - d. Pregnancy
 - e. Hospital orientation
 - f. Dress code
 - g. Absences and holidays
 - h. Time line of progression
 - i. Clinical evaluation assessment tools
- 4. Participation in radiographic procedures
 - a. X-ray room preparation
 - b. Moving patients
 - c. Patient communication

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- i. Cultural, race, disability, and gender competence
 - ii. Language proficiency and interpreters
 - iii. Nonverbal communication
 - iv. Empathy and compassion
 - d. Patient positioning
 - e. Image critique
 - 5. Electronic patient files
 - a. Hospital information system
 - b. Radiology information system
 - 6. Patient prep
 - a. Gown
 - b. Exam preparation
 - 7. Radiographic equipment manipulation
 - 8. Radiation protection
 - a. Patient
 - b. Radiographer
 - c. Pregnant patient

Methods of Instruction

Method

Lecture

Integration

Lecture and demonstration will be used to present information about the proper positions for patient imaging of fluoroscopy and advanced imaging procedures while emphasizing the crucial aspects of patient care and communication, with a particular focus on considerations related to gender, race, culture, and disabilities.

Method

Reading

Integration

Reading assignments from the textbook, Radiographic Positioning and Related Anatomy, Chapters 19, will be completed by the students. These assignments will be followed with a classroom discussion to help develop the critical thinking skills necessary for a radiographer to produce a high quality radiographic images of the fluoroscopy procedures and advanced imaging procedures.

Method

Film/video Viewing and Discussion

Integration

In order to enhance students' understanding of advanced imaging exams in radiography, video presentations will be presented illustrating proper procedures. These videos, available on YouTube, offer comprehensive step-by-step guidance for imaging patients in a radiography room setting. As an example, there is a 50 minute YouTube video, "What to expect at your HSG: Tips from a Nurse Practitioner" that explains what a hysterosalpingogram procedure involves and fluoroscopic images to demonstrate the introduction of contrast media. These instructional videos aim to provide students with a realistic preview of what to expect during their clinical training when they begin imaging actual patients. Following the video presentations, students will engage in an instructor guided discussion addressing the challenges radiographers may encounter when imaging a diverse range of patients.

Method

Lab Activities

Integration

During the semester, students will undergo hands-on training at the affiliated hospital's radiology department for two days each week, with each session lasting 8 hours. This practical training experience is designed to enable students to actively apply their theoretical knowledge to the process of imaging real patients while receiving direct supervision.

This training opportunity will help students familiarize themselves with the department's policies and procedures. Furthermore, it will provide them with a platform to observe, inquire, actively participate, and learn from any potential mistakes they make while carrying out tasks typical of a radiographer's day-to-day responsibilities.

While students possess theoretical knowledge in chest, abdomen, and extremity procedures, this practical training will empower them to put that knowledge into action when imaging real patients. There are no specific limitations on which radiographic procedures students may observe, but the program places particular emphasis on their active participation in fundamental exams, such as those related to chest and abdomen imaging.

Methods of Evaluation

Method

Exams/Tests

Integration

Exams and tests will assess the student's ability to grasp concepts related to advanced radiographic procedures such as fluoroscopy, hysterosalpingography, arthrography, myelography, and mammography. Exams and tests will be given to measure student understanding of the subject matter and the ability to analyze contributions to advanced radiographic procedures. The exams will be multiple choice to help prepare the students to pass the American Registry of Radiologic Technologists exam which is also in multiple choice format. Exams/tests are graded on accuracy.

Method

Other

Integration

Students will undergo mid-semester and end-of-semester clinical evaluations, which will be assessed by the Clinical Instructor at the affiliated hospital training site. These evaluations include a comprehensive skills checklist designed to measure the student's clinical progress. The assessment encompasses various aspects, including the ability to follow instructions from supervising radiographers, effective communication with patients and healthcare colleagues, assisting patients in preparing for radiographic procedures, active observation and participation in radiographic procedures, and a sound understanding of imaging department procedures and protocols.

Method

Other

Integration

Students will undergo a clinical evaluation using a skills checklist to assess their proficiency in safely transporting patients between the imaging department and the patient's room. This assessment will be conducted by the Clinical Instructor or an assigned representative at the affiliated hospital training site. The evaluation aims to gauge the student's ability to transport patients effectively, whether in a wheelchair or on a gurney, while adhering to proper body mechanics and ensuring patient safety.

Assignments

Assignment Type

Other

In-class and/or outside of class

Outside of class

Formative or Summative

Summative

Assignment

You will be evaluated on your performance in acclimating to the hospital imaging department, interacting with other radiographers and radiologists, utilizing the radiology equipment to participate in producing basic imaging procedures such as the chest and abdomen images, on a diverse population of patients under direct supervision while maintaining proper patient care and radiation protection.

Evaluation Guidelines:

1. Equipment utilization

Familiarize yourself with the radiology equipment's functions and controls.
Ensure the equipment is in working order before each imaging procedure.
Perform chest and abdomen imaging following established protocols.

2. Patient Care

Greet patients and explain the imaging procedure in a clear and empathetic manner.
Verify patient identification and relevant medical history.
Assist patients in positioning themselves correctly for imaging.
Monitor patients for any discomfort or distress during the procedure.
Provide post-imaging care as necessary.

3. Radiation Protection

Adhere to radiation safety guidelines and protocols.
Use lead aprons and shields as appropriate for both patients and personnel.
Minimize radiation exposure by optimizing imaging settings.
Maintain a safe distance from the radiation source.

4. Diverse Patient Population:

Interact professionally and respectfully with patients from diverse backgrounds.
Adapt your communication style to accommodate varying patient needs.
Recognize and address any cultural considerations or language barriers.

Assignment Evaluation:

Performance in this assignment will be evaluated based on the following criteria:

Technical proficiency in operating radiology equipment.

Patient care skills and empathy.

Adherence to radiation protection protocols.

Ability to work effectively with a diverse patient population and other healthcare professionals.

The competency evaluations employ a Likert scale ranging from 1 to 5, with 1 indicating a need for improvement and progressively moving up to a 5 ranking, signifying that the student consistently performs the skill accurately. You will need to achieve a minimum of 75% to successfully pass the competency evaluation.

Assignment Type

Other

In-class and/or outside of class

Outside of class

Formative or Summative

Summative

Assignment

Complete the competency evaluation for Transportation by the end of the semester. This evaluation provides a skills checklist for the Clinical Instructor or another designed healthcare worker, to assess your ability to safely and effectively transport patients to and from the radiology department within an affiliated hospital setting.

Instructions:

Preparation: Ensure you have the necessary knowledge, skills, and equipment for safe patient transportation. This includes understanding hospital protocols, patient safety measures, and equipment operation.

Communication: Effectively communicate with patients, their families, and healthcare colleagues to coordinate patient transportation. Ensure that patients, regardless of their gender, race, culture, or disabilities, understand the process and are comfortable. Tailor your communication to be culturally sensitive and inclusive.

Patient Assessment: Conduct a thorough assessment of the patient's condition to determine their suitability for transportation. Consider factors such as vital signs, mobility, and any specific patient needs.

Equipment Setup: Properly set up and inspect all equipment required for safe transportation, including wheelchairs, stretchers, or other mobility aids. Ensure equipment is clean and in good working condition.

Patient Transfer: Safely transfer the patient onto the designated mode of transportation (e.g., wheelchair, stretcher) with attention to minimizing discomfort or risk of injury.

Safety Measures: Implement safety measures during transportation, such as securing the patient and equipment, using appropriate restraints, and following hospital guidelines.

Transportation Process: Navigate the patient to and from the radiology department within the affiliated hospital, following designated routes and protocols. Be attentive to patient comfort and safety throughout the journey.

Emergency Response: Be prepared to respond to emergencies or adverse events during transportation. Know the appropriate steps to take and communicate effectively with the healthcare team.

Post-Transportation Assessment: After safely delivering the patient to their destination, conduct a post-transportation assessment to ensure the patient is stable and comfortable. Address any issues promptly.

The competency evaluations employ a Likert scale ranging from 1 to 5, with 1 indicating a need for improvement and progressively moving up to a 5 ranking, signifying that the student consistently performs the skill accurately. You will need to achieve a minimum of 75% to successfully pass the competency evaluation.

Assignment Type

Reading

In-class and/or outside of class

In-class

Formative or Summative

Formative

Assignment

Read and review chapters 2-5 of "Bontrager's Textbook of Radiographic Positioning and Related Anatomy," 10th edition by John Lampignano to ensure that you are well-prepared to perform radiographic procedures for various anatomical regions, such as chest and abdomen, safely and effectively.

As you read, take notes on key concepts, positioning terminology, and anatomical landmarks. Pay close attention to positioning principles, central ray alignment, and the importance of radiation protection. Reflect on how the knowledge gained from these chapters will be applicable to your clinical practice.

Be prepared for a discussion on the material covered in the assigned chapters during the next visit by the Clinical Coordinator to your hospital. Utilize the information you gather from this reading assignment to enhance your practical skills during clinical training.

Assignment Type

Reading

In-class and/or outside of class

In-class

Outside of class

Formative or Summative

Formative

Assignment

Read the California Department of Public Health's Fluoroscopy regulations, which will be provided to you by the instructor, prior to the next class meeting. Your task is to analyze the purpose of these regulations and be prepared to discuss in class how these regulations effectively reduce patient exposure.

Key Questions to Consider While Reading:

What is the primary purpose of fluoroscopy in medical procedures?

What specific regulations and guidelines are outlined by the California Department of Public Health for the use of fluoroscopy?

How do these regulations aim to protect patients from unnecessary radiation exposure?

Are there any notable requirements or restrictions on equipment or operator qualifications?

What are the consequences of non-compliance with these regulations?

How do these regulations align with broader healthcare quality and safety initiatives?

Are there any recent updates or amendments to these regulations that you need to be aware of?

Discussion Points for Class:

During our class meeting, we will discuss the following points related to the California Department of Public Health's Fluoroscopy regulations:

The role of fluoroscopy in modern medicine and its benefits.

An overview of the specific regulations and guidelines, highlighting key provisions.

A critical analysis of how these regulations effectively reduce patient exposure to ionizing radiation.

The importance of compliance with these regulations for healthcare facilities and professionals.

Case studies or examples illustrating the impact of these regulations on patient safety.

Come to the class meeting prepared to share your insights and engage in a meaningful discussion about the regulation of fluoroscopy and its impact on patient care. Grading for this assignment is based on participation, content understanding, preparedness for discussion, critical thinking, and critical thinking in analyzing the effectiveness of the regulations in reducing patient exposure.

Assignment Type

Writing

In-class and/or outside of class

Outside of class

Formative or Summative

Summative

Assignment

Write a well-structured paper to respond to the following statements. Focus on grammar, organization, clarity, and coherence.

1. Provide a brief introduction to fluoroscopy, explaining what it is and its common medical applications.
2. Describe the potential risks associated with fluoroscopy for both patients and healthcare personnel.
3. Identify the key organizations and regulatory bodies responsible for setting fluoroscopy regulations and safety guidelines. This may include government agencies, professional associations, and international bodies.
4. Explain the primary reasons for implementing regulations in the field of fluoroscopy, including the protection of patients and healthcare workers and the reduction of unnecessary radiation exposure.
5. Discuss the role of medical professionals (e.g., radiologists, radiologic technologists) in adhering to these regulations and guidelines and the consequences of non-compliance.
6. Analyze how patients from different racial and cultural backgrounds may have unique preferences, needs, and challenges when it comes to medical procedures like fluoroscopy. Give several examples and how any challenges may be resolved.

Be prepared to verbally summarize your paper's content in class. Highlight key findings and proposed solutions. Engage in an in-class discussion to exchange ideas and viewpoints on the various topics.

Grading Criteria:

Your paper will be assessed based on the following criteria:

Content and Relevance: Depth of research, accuracy of information, and relevance to patient diversity.

Structure and Organization: Clarity and coherence of the paper's structure and flow.

Grammar and Language: Correct use of grammar, spelling, and language.

Proposed Solution: The comprehensiveness and feasibility of the proposed solution.

Course Materials

Textbooks

1. Lampignano, John (2020), Bontrager's Textbook of Radiographic Positioning and Related Anatomy, 10th Ed., Elsevier. ISBN#: 978-0323749565
2. Bushong, S., (2021) Radiologic Science for Technologists: Physics, Biology, and Protection, 12th Ed., Elsevier. ISBN#: 978-0323661348

Class Size Information

Class Size

32

Class Size Category

G - Large lab 32

Diversity and Inclusion

Explain how diversity and inclusion(e.g., gender, culture/race, sexuality, etc.) is infused into the course.

This course introduces the student to on-the-job training at an affiliated hospital in the imaging department under direct supervision of a licensed radiographer. Students will be able to observe and have some participation in basic radiographic procedures, such as the chest and abdomen, and interact with patients. Students interact with other imaging department personnel, doctors, and other healthcare workers in the course of their training.

The students will have opportunities to interact with a diverse population of people that have a different race, culture, ethnicity, gender identity, and disability from themselves. Students will apply theoretical knowledge of diversity and inclusion into actual practice.

Course objectives and learning outcomes are supported through actual patient interactions to foster knowledge, empathy, and patient advocacy in developing future healthcare professionals.

Describe how assignments, instruction, evaluation, course content, and interactions are contextualized for diverse learners promoting an equitable course.

The course resources are offered in multiple forms to offer diverse learning methods to students. Audio learners can utilize in class instructor lectures; Visual learners can utilize power-point presentations from the instructor, required textbook readings, and demonstrations presented by the instructor on special imaging procedures; Hands-on learners will benefit by participation in radiography procedures in the hospital setting interacting and imaging actual patients from a diverse population.

Interactions

Explain how the course will incorporate student-to-student interaction.

This course includes a lecture component that facilitates classroom discussions on various advanced imaging procedures. Furthermore, students will have the opportunity to enrich these discussions with their own personal experiences, as they will actively undergo training in the imaging department at an affiliated hospital.

Explain how the course will incorporate instructor-to-student interaction.

The in-class instructor will interact with the students through face to face lectures where students may ask questions about fluoroscopy and special imaging procedures. The instructor uses real-life experience stories during lectures to enhance student learning. The Clinical Instructor at the affiliated hospital will interact directly with the student in learning and performing the day-to-day radiography tasks. Students will mostly observe the supervising radiographer in performing fluoroscopic procedures but will have opportunities to ask questions post exam. The instructor uses real-life experience stories during lectures to enhance student learning.

Explain how the course will incorporate student-to-content interaction.

This course relies on two comprehensive textbooks that serve as essential guides for radiographers. Students engage with the course material through textbook readings, PowerPoint lectures, and hands-on practical experience in a hospital setting. In this clinical environment, they perform radiographic procedures on patients from diverse backgrounds, encompassing varying genders, races, cultures, and abilities. Emphasis will be placed on actively participating in chest and abdomen exams and observing fluoroscopic procedures.

Students will read the MSJC Radiology Department policies and procedures, ensuring they fully comprehend and adhere to these guidelines.

To foster a seamless transition into the hospital environment, students will participate in thorough hospital orientations. These orientations will not only acquaint them with hospital policies but also provide an open platform for students to seek clarification and ask questions. This proactive approach to student-to-content interaction ensures that students are well-prepared and engaged throughout their clinical experience.

Explain how the course will incorporate student-to-self interaction (metacognitive).

In this course, students are provided with the opportunity to engage in the generation of high-quality radiographic images of the chest and abdomen, all while prioritizing the minimization of radiation exposure for both themselves and the patient. The overarching objective is to foster an environment that encourages students to critically assess and optimize the diagnostic interpretability of radiographs from a radiologist's perspective.

Throughout the course, students will actively participate in imaging real patients who belong to various demographic groups within a hospital training setting. Through this hands-on experience, they will not only develop their technical skills but also cultivate a heightened level of self-awareness and confidence in their ability to excel in this specialized field of healthcare. This approach empowers students to not only master the technical aspects of their craft but also to deeply reflect on the ethical and professional dimensions of their practice.

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