

R T 64: FLUOROSCOPY

Foothill College Course Outline of Record

Heading	Value
Effective Term:	Summer 2022
Units:	3
Hours:	40 lecture, 15 laboratory per quarter (55 total per quarter) This course does not meet a full 12 weeks.
Prerequisite:	R T 55C or current certification in Radiologic Technology or Radiation Therapy Technology.
Degree & Credit Status:	Degree-Applicable Credit Course
Foothill GE:	Non-GE
Transferable:	CSU
Grade Type:	Letter Grade Only
Repeatability:	Not Repeatable

Student Learning Outcomes

- Identify and describe various types of regulatory provisions and radiation safety measures associated with fluoroscopy.
- Identify components and their functions of the x-ray image intensifier .

Description

Principles of radiation protection and fluoroscopic equipment, application of special equipment, illumination, anatomy and physiology of the eye and relationship of internal organs. Intended for students in the Radiologic Technology Program; enrollment is limited to students accepted in the program.

Course Objectives

The student will be able to:

- Compare image quality factors associated with fluoroscopy with general radiography.
- Cite the regulatory provisions and radiation safety measures of fluoroscopic equipment.
- Identify components of fluoroscopic equipment.
- Identify components of a fluoroscopic image intensifier.
- Describe how fluoroscopic images are created and displayed.
- Identify fluoroscopic image recording and acquisition options.
- Describe special fluoroscopic equipment settings, their function and safe application for each.
- Define and discuss the regulations and guidelines associated with mobile image intensified units.
- Describe anatomy and physiology of the eye.
- Identify and describe the various radiation safety components in fluoroscopy.
- Identify and describe methods of ensuring radiation protection for both patient and operator.

- Identify and describe various ways of maintaining quality control in fluoroscopy.
- Describe illumination.

Course Content

- Quality factors of fluoroscopy vs. general radiography (Lec and Lab)
 - X-ray beam attenuation including filtration, patient factors, grids, inverse square law
 - X-ray beam restrictors (collimation)
 - Image geometry, including minification, magnification, distortion, penumbra, motion
 - Image clarity, including contrast
 - Image quality
- Regulatory provisions and radiation safety, to include the following: (Lec and Lab)
 - Installation of fluoroscopy equipment
 - Primary protective barrier
 - Secondary protective barriers
 - Occupancy factor (T)
 - Workload factor (W)
 - Use factor (U)
 - Mobile screens
 - Bucky slot cover
 - Protective curtains or drape
 - Collimation
 - Cumulative timer
 - Auto brightness control
 - Technical factors
 - Excessive light
 - X-ray intensity
 - X-ray quality
 - Protective clothing
 - Lead glass goggles and glasses
 - Isoexposure curves (different examinations—upright and horizontal table)
 - Radiation dose for patient for various examinations
 - Radiation exposure to operator and others
 - Definitions pertaining to fluoroscopy equipment
- Fluoroscopy equipment, to include the following: (Lec and Lab)
 - Construction of different types of units
 - Operating technical factors
 - Timing
 - Filtration
 - X-ray beam restriction
 - Safety factors
 - Inverse square law
 - Exposure control
 - Statistical quality of fluoroscopic image
 - Grids
 - AERC/AEC/ABS
 - DAP meter
 - Digital equipment, to include II and flat panel

- n. Definitions and terminology related to digital fluoroscopic equipment
4. Fluoroscopic image intensifier and flat panel detectors, to include the following: (Lec and Lab)
 - a. Components
 - b. Types (design)
 - c. Brightness gain
 - d. Image quality
 - e. Contrast
 - f. Resolution
 - g. Distortion
 - h. Quantum mottle
 - i. Viewing systems
 5. Television display of fluoroscopic images, to include the following: (Lec and Lab)
 - a. Closed circuit systems
 - b. Video signal production (cameras)
 - c. Video signal production (monitor)
 - d. Image quality
 - e. Resolution
 - f. Lag
 - g. Brightness
 6. Image recording and acquisition, to include the following: (Lec and Lab)
 - a. Overhead imaging
 - b. Recording devices
 - c. Spot imaging
 - d. Digital subtraction angiography (DSA)
 7. Application and special equipment, with emphasis on the following:
 - a. Remote control units
 - b. Specialized procedures
 - c. Emergency room procedures
 - d. Patient factors
 8. Mobile image intensified unit (C-arm), to include the following: (Lec and Lab)
 - a. Special requirements
 - b. Source-to-skin distance
 - c. X-ray beam intensity
 - d. Special applications
 - e. Isoexposure curves for various examinations
 - f. Control panel and ancillary equipment
 9. Anatomy and physiology of the eye, with emphasis on: (Lec)
 - a. Anatomy of the eye
 - b. Optical system of the eye
 - c. Receptor system
 - d. Color vision
 - e. Rod and cone sensitivity to different wavelength light
 - f. Visual acuity
 - g. Integration or recognition time
 - h. Intensity discrimination
 - i. Illumination and photometry
 - j. Contrast perception
 10. Radiation safety components
 - a. Collimators
 - b. ABC/AERC
 - c. Pulsed fluoroscopy
 - d. LIH (last image hold)
 - e. Cumulative timer
 - f. Dose modes
 11. Radiation protection for patient and operator
 - a. Radiation biology
 - b. Exposure factors
 - c. Shielding
 - d. Beam restriction
 - e. Filtration
 - f. Patient positioning
 - g. Dose and time reduction
 - h. Protective devices, to include shields, timers, drapers and slot cover
 - i. Dosimetry
 - j. ALARA
 - k. Pediatric dose reduction
 12. Quality control, to include the following: (Lec and Lab)
 - a. Minimum source-to-table top distance beam restriction system
 - b. Resolution performance
 - c. Low contrast performance
 - d. Grid alignment
 - e. Fluoroscopic exposure rate
 - f. Fluoroscopic beam quality
 - g. Automatic exposure control system
 13. Illumination, to include the following: (Lec and Lab)
 - a. Lumen
 - b. Visible screen spectrum
 - c. Visible light
 - d. Light measurement
 - e. Brightness of fluoroscopic viewing
 - f. Optics
 - g. Vignetting
 - h. Magnification
 - i. Veiling glare

Lab Content

1. Lab objectives
 - a. Demonstrate various methods of reducing dose to the patient during fluoroscopy (patient radiation protection)
 - b. Illustrate ways how one can reduce exposure to self and personnel (operator protection)
 - c. Identify and practice ways of maintaining quality control of fluoro equipment and practice equipment operation

Special Facilities and/or Equipment

1. On or off campus energized x-ray laboratory
2. Test tools
3. Phantoms
4. QC tracking tools

Method(s) of Evaluation

Methods of Evaluation may include but are not limited to the following:

Quizzes
Midterm and final examination

Method(s) of Instruction

Methods of Instruction may include but are not limited to the following:

Lecture
Discussion
Research
Laboratory experiments

Representative Text(s) and Other Materials

All materials will be provided by the instructor.

Types and/or Examples of Required Reading, Writing, and Outside of Class Assignments

1. Students will have collaborative study and learning activities in which they prepare for structured assessments and tests
2. Students will complete fluoroscopy exams and participate in fluoroscopy quality control activities at their clinical sites in order to complete assignments related to specific course content with the purpose of connecting text and lecture to real world applications

Discipline(s)

Radiological Technology