

RADT M02B: RADIOGRAPHIC TECHNIQUE II

Originator

rdarwin

College

Moorpark College

Discipline (CB01A)

RADT - Radiologic Technology

Course Number (CB01B)

M02B

Course Title (CB02)

Radiographic Technique II

Banner/Short Title

Radiographic Technique II

Credit Type

Credit

Start Term

Spring 2021

Catalog Course Description

Covers basic principles of radiation protection and radiobiology as well as state and federal regulations for diagnostic uses of radiation. Includes problem solving, quality assurance and quality control, automatic exposure control, digital systems and an introduction to Computed Tomography (CT).

Taxonomy of Programs (TOP) Code (CB03)

1225.00 - *Radiologic Technology

Course Credit Status (CB04)

D (Credit - Degree Applicable)

Course Transfer Status (CB05) (select one only)

B (Transferable to CSU only)

Course Basic Skills Status (CB08)

N - The Course is Not a Basic Skills Course

SAM Priority Code (CB09)

C - Clearly Occupational

Course Cooperative Work Experience Education Status (CB10)

N - Is Not Part of a Cooperative Work Experience Education Program

Course Classification Status (CB11)

Y - Credit Course

Educational Assistance Class Instruction (Approved Special Class) (CB13)

N - The Course is Not an Approved Special Class

Course Prior to Transfer Level (CB21)

Y - Not Applicable

Course Noncredit Category (CB22)

Y - Credit Course

Funding Agency Category (CB23)

Y - Not Applicable (Funding Not Used)

Course Program Status (CB24)

1 - Program Applicable

General Education Status (CB25)

Y - Not Applicable

Support Course Status (CB26)

N - Course is not a support course

Field trips

Will not be required

Grading method

(L) Letter Graded

Does this course require an instructional materials fee?

No

Repeatable for Credit

No

Is this course part of a family?

No

Units and Hours

Carnegie Unit Override

No

In-Class

Lecture

Minimum Contact/In-Class Lecture Hours

52.5

Maximum Contact/In-Class Lecture Hours

52.5

Activity

Laboratory

Total in-Class

Total in-Class

Total Minimum Contact/In-Class Hours

52.5

Total Maximum Contact/In-Class Hours

52.5

Outside-of-Class

Internship/Cooperative Work Experience

Paid**Unpaid****Total Outside-of-Class****Total Outside-of-Class****Minimum Outside-of-Class Hours**

105

Maximum Outside-of-Class Hours

105

Total Student Learning**Total Student Learning****Total Minimum Student Learning Hours**

157.5

Total Maximum Student Learning Hours

157.5

Minimum Units (CB07)

3

Maximum Units (CB06)

3

Prerequisites

RADT M01B and RADT M01BL

Corequisites

RADT M02A and RADT M02AL and RADT M02BL and RADT M12

Limitations on Enrollment

Criminal background clearance

Drug and alcohol clearance

Proof of freedom from and immunity to communicable diseases

No acrylic or long nails in clinical settings

Current negative TB test or chest x-ray

Others (specify)

Physical examination demonstrating general good health

No visible tattoos or visible body piercings except single studs in earlobes

Other Limitations on Enrollment

Fire Safety Card

Proof of health insurance

proof of professional liability insurance

Entrance Skills**Entrance Skills**

RADT M01B

Prerequisite Course Objectives

1. identify the different types of x-ray equipment including diagnostic and fluoroscopic.
2. define the function of each of the tube parts and their influence on radiographic technique.
3. describe the production of Bremss (Bremsstrahlung) and characteristic radiation.
4. discuss various photon interactions with matter by describing the interaction, relation to atomic number, photon energy and part density, and their applications in diagnostic radiology.
5. discuss the clinical significance of the photoelectric and modified scattering interactions in diagnostic imaging.
6. list the various component parts of the x-ray recording system for digital departments.
7. discuss the fundamentals of digital radiography, distinguishing between cassette-based systems and cassette-less systems.
8. discuss digital image formation.

9. discuss grids and their use in a digital department.
10. describe the various types of image receptor holders and their use.
11. discuss practical considerations in setting standards for acceptable image quality.

Entrance Skills

RADT M01BL

Prerequisite Course Objectives

1. perform basic quality control tests
 2. differentiate between technical factor problems, procedural problems, and equipment malfunctions.
 3. evaluate image quality on a radiographic image.
 4. perform experiments which prove the different factors that affect image quality.
 5. analyze the relationships of factors controlling image quality.
 6. evaluate the results of basic quality control (QC) tests.
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Requisite Justification**Requisite Type**

Prerequisite

Requisite

RADT M01B

Requisite Description

Course in a sequence

Level of Scrutiny/Justification

Required by statute or regulation

Requisite Type

Prerequisite

Requisite

RADT M01BL

Requisite Description

Course in a sequence

Level of Scrutiny/Justification

Required by statute or regulation

Requisite Type

Corequisite

Requisite

RADT M02A

Requisite Description

Course in a sequence

Level of Scrutiny/Justification

Required by statute or regulation

Requisite Type

Corequisite

Requisite

RADT M02AL

Requisite Description

Course in a sequence

Level of Scrutiny/Justification

Required by statute or regulation

Requisite Type

Corequisite

Requisite

RADT M02BL

Requisite Description

Course in a sequence

Level of Scrutiny/Justification

Required by statute or regulation

Requisite Type

Corequisite

Requisite

RADT M12

Requisite Description

Course in a sequence

Level of Scrutiny/Justification

Required by statute or regulation

Requisite Type

Enrollment Limitation

Requisite

1) Criminal background clearance; 2) Current CPR certification for health care provider (American Heart Association); 3) Drug and alcohol clearance; 4) No acrylic or long nails in clinical settings; 5) Current negative TB test or chest x-ray; 6) Physical examination demonstrating general good health; 7) No visible tattoos or visible body piercings except single studs in earlobes; 8) Other, Fire Safety Card, proof of health insurance, and proof of professional liability insurance.

Requisite Description

Credit program requisite (credit only)

Level of Scrutiny/Justification

Required by statute or regulation

Student Learning Outcomes (CSLOs)

Upon satisfactory completion of the course, students will be able to:

- 1 describe both pre and post processing of the digital image.
- 2 discuss the principle of radiation protection and the effect at a cellular and organism level.

Course Objectives

Upon satisfactory completion of the course, students will be able to:

- 1 evaluate the basic legal and ethical principles/methods for radiation protection.
- 2 identify personnel monitoring devices in terms of type, purpose, characteristics, advantages and disadvantages.
- 3 evaluate the relationship of exposure factors to patient dosage.
- 4 identify dose equivalent limits for radiation workers and the general public.

- 5 identify the various responses of human tissue and organs as a result of radiation exposure.
- 6 identify federal and state regulatory agencies and their functions.
- 7 discuss regulations (state and federal) influencing radiation protection.
- 8 validate the purpose of Title 17 (the California Radiation Health and Safety Act) and the National Council on Radiation Protection and Measurements (NCRP).
- 9 differentiate between procedural factor problems and equipment malfunctions.
- 10 evaluate the results of basic quality control tests and discuss the benefits of a quality management program to the patient and the department.
- 11 discuss Picture Archiving and Communication Systems (PACS), Digital Imaging and Communication in Medicine (DICOM), Hospital Information System (HIS) and their integration in an imaging department.
- 12 describe the various types of digital receptors, their function, limits and advantages.
- 13 relate the histogram analysis to automatic rescaling and how it affects the exposure indicator.
- 14 relate the exposure indicator value to technical factors, system calibration, part/beam/plate alignment, and patient exposure.

Course Content

Lecture/Course Content

- 5% Quality assurance and control
- 2% Automatic exposure control
- 15% Title 17 and NCRP Regulations
- 20% Radiobiology and biological effects of radiation
- 18% Radiation protection
- 30% Digital image acquisition and display
- 10% Electronic information gathering and transfer

Laboratory or Activity Content

None

Methods of Evaluation

Which of these methods will students use to demonstrate proficiency in the subject matter of this course? (Check all that apply):

- Problem solving exercises
- Written expression

Methods of Evaluation may include, but are not limited to, the following typical classroom assessment techniques/required assignments (check as many as are deemed appropriate):

- Classroom Discussion
- Essay exams
- Objective exams
- Problem-solving exams
- Reports/Papers/Journals

Instructional Methodology

Specify the methods of instruction that may be employed in this course

- Audio-visual presentations
- Collaborative group work
- Class discussions
- Demonstrations
- Lecture
- Small group activities

Describe specific examples of the methods the instructor will use:

PowerPoint presentations and group breakout sessions to analyze the presentations.

Representative Course Assignments

Writing Assignments

Write a short paper that examines state and federal regulations influencing radiation protection.
Write answers to discussion questions in the text.
Write answers to objectives for each lecture.

Critical Thinking Assignments

Calculate technique problems based on patient's condition or room availability.
Analyze and discuss the process of acute radiation sickness.
Analyze regulations and their origin.

Reading Assignments

Read American Society of Radiologic Technology (ASRT) journal articles.
Read California Department of Health-Radiologic Health Branch Title 17.

Outside Assignments

Representative Outside Assignments

Read assigned chapters from textbook and professional journals pertaining to radiation protection, regulations, digital systems, and computed tomography.
Perform Internet-based reading and exams from Mosby's Radiobiology and Radiation Protection Module.

Articulation

Equivalent Courses at 4 year institutions

University	Course ID	Course Title	Units
CSU, Northridge	HSCI 182	Medical Imaging Sciences II	3

Equivalent Courses at other CCCs

College	Course ID	Course Title	Units
Foothill College	RT 55B	Principles of Radiologic Technology II	3
Mount San Antonio College	RAD 62A	Theory of Radiographic Technology	4

District General Education

A. Natural Sciences

B. Social and Behavioral Sciences

C. Humanities

D. Language and Rationality

E. Health and Physical Education/Kinesiology

F. Ethnic Studies/Gender Studies

Course is CSU transferable

Yes

CSU Baccalaureate List effective term:

FALL 1995

CSU GE-Breadth

Area A: English Language Communication and Critical Thinking

Area B: Scientific Inquiry and Quantitative Reasoning

Area C: Arts and Humanities

Area D: Social Sciences

Area E: Lifelong Learning and Self-Development

Area F: Ethnic Studies

CSU Graduation Requirement in U.S. History, Constitution and American Ideals:

IGETC

Area 1: English Communication

Area 2A: Mathematical Concepts & Quantitative Reasoning

Area 3: Arts and Humanities

Area 4: Social and Behavioral Sciences

Area 5: Physical and Biological Sciences

Area 6: Languages Other than English (LOTE)

Textbooks and Lab Manuals

Resource Type

Textbook

Description

Bushong, Stewart. *Radiologic Science for Technologists: Physics, Biology and Protection*. 11th ed., Mosby, 2017.

Resource Type

Textbook

Classic Textbook

No

Description

Carroll, Quinn. *Radiography in the Digital Age: Physics - Exposure - Radiation Biology*. 3rd ed., Charles C. Thomas, 2018.

Library Resources

Assignments requiring library resources

Research using the Library's print and online resources, to locate articles in the area of radiology.

Sufficient Library Resources exist

Yes

Example of Assignments Requiring Library Resources

Research, using the Library's print and online resources, to prepare short papers on the biological effects of radiation exposure. Reading of articles in health/medical journals on appropriate topics.

Primary Minimum Qualification
RADIOLOGIC TECHNOLOGY

Review and Approval Dates

Department Chair

01/15/2020

Dean

01/27/2020

Technical Review

02/20/2020

Curriculum Committee

MM/DD/YYYY

DTRW-I

03/12/2020

Curriculum Committee

MM/DD/YYYY

Board

04/14/2020

CCCCO

05/01/2020

Control Number

CCC000616712

DOE/accreditation approval date

MM/DD/YYYY