NEW YORK CITY COLLEGE OF TECHNOLOGY
THE CITY UNIVERSITY OF NEW YORK

Department of Radiologic Technology & Medical Imaging

RAD 1124
Introduction to Radiologic Technology & Medical Imaging
Course Outline / Learning Outcomes

Spring 2019
Professor J. Polcari, MS, RT(R)
Room A - 408
Jpolcari@citytech.cuny.edu

Class: Friday 08:30 – 09:20 am
       Friday 10:00 – 10:50 pm
Office hours: Friday 09:25 – 10:00 am

Note: All other course related documents could be found on Blackboard.

Revised: January 2019
COURSE: RAD 1124 - Introduction to Radiologic Technology & Medical Imaging (1hr., 1 cr.)

INSTRUCTOR: Professor J. Polcari MS, RT(R) OFFICE: Room A-408

EMAIL: Jpolcari@citytech.cuny.edu PHONE: (718) 260-5360

OFFICE HOURS: Friday 09:20 – 10:00 am (by Appt only)

COURSE DESCRIPTION:
This course provides an introduction to the various imaging procedures performed by radiologic technologists. Students who are not eligible for other RAD courses may take this course.

PREREQUISITES: CUNY certification in reading; department approval required.

COURSE LEARNING OUTCOMES:
Upon completion of RAD 1124, students will be able to:
1. Define basic medical terminology
2. Discuss the field of radiologic technology
3. Provide a historical perspective on the evolution of technology in radiologic technology
4. Articulate the various imaging techniques employed in the field
5. Discuss the requirements for success in the educational program
6. Reflect and evaluate a career in radiologic technology

REQUIRED TEXTBOOK:

COURSE REQUIREMENTS AND ASSESSMENT
Students enrolled in RAD 1124 must:
1. Attend and actively participate in all lecture sessions
2. Participate in all scheduled exam and quiz sessions. No make-up quiz/exams will be given during the semester. After all, students are expected to demonstrate that they are dependable as a requirement for all health care professional.

   Note: All quizzes will be given during the last 15 minutes of class. A grade of zero will be entered for quizzes/exams missed.

3. Complete an online (Blackboard) assignment by February 8, 2019 by 11:59 PM.
   Assignment:
   You must write approximately 5 sentences introduction about yourself. Tell the class who you are, why or how you became interested in medical imaging as a career choice, what you expect to get out of this course. You also have to ask a question of your classmates (about anything you want). You will all have to log in next week and respond to at least one question.

4. Obtain review lecture materials posted on blackboard before each class during the entire semester.
5. Meet on blackboard when indicated by the instructor.
COURSE GRADING
1. Course Active Participation 10%
2. Average of quizzes 20%
3. Blackboard (online) Participation 5%
4. Midterm Exam 20%
5. Final Exam 45%
Total 100%

GRADING POLICY FOR ALL RADIOLOGIC TECHNOLOGY COURSES DESIGNATED WITH THE PREFIX RAD

<table>
<thead>
<tr>
<th>Grading</th>
<th>Grade Range</th>
<th>Quality Points</th>
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<tr>
<td>A</td>
<td>93 – 100</td>
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<tr>
<td>A-</td>
<td>90 – 92.9</td>
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<tr>
<td>B+</td>
<td>87 – 89.9</td>
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<td>B</td>
<td>83 – 86.9</td>
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<td>B-</td>
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<td>C+</td>
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<td>C</td>
<td>70 – 76.9</td>
<td>2.0 -&gt; RAD 1124 passing grade</td>
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<tr>
<td>D</td>
<td>60 – 69</td>
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<td>F</td>
<td>0 – 59</td>
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EXPLANATION OF COURSE GRADING

1. COURSE ACTIVE PARTICIPATION
You are expected to **actively participate** in all assigned activities in and out of the classroom, and/or during online sessions through discussion, inquiry and individual or group activities. This means that it's not enough to just be present in class. You must fully participate in order to receive credits. If you do not have anything to add to the discussion, then asking poignant questions will contribute to the discussion and counted as active participation. On scheduled class days, please plan to arrive on time (best to arrive early). Late arrivals will adversely affect your grade in the Active Participation category.

If we are unable to meet for class because of any unforeseen circumstances, the materials for that week will be available on Blackboard (Bb), and you will be expected to access the information asynchronously. For online assignments and/or lecture sessions, Active Participation will be based on accessing the learning materials on Bb, following instructions, asking questions and posting assignments by the established deadlines. Late posts will be counted as late participation. A 25 point reduction per day will be given for work submitted late. In emergency situations (if Bb is inaccessible), work may be submitted via email with full explanation for the late arrival; otherwise all work should be submitted through Bb.

2. QUIZZES
There will be a total of four (3) quizzes as noted on the Outline on page 6. Quizzes will reflect materials taught in previous classes, and will be given during the last 15 minutes of class. Students who do not attend class on the day of quiz will receive a grade of "0". **There will be no make-up quizzes or exams.**
3. **CUMULATIVE MIDTERM EXAM**
   This exam is comprehensive and will consist of all previously covered materials and activities, including all assigned readings, discussions, text notes, and slide presentations etc.

4. **BLACKBOARD PARTICIPATION**
   Each student is required to post their introduction by February 8th, 2019, by 11:59 pm. For further information, please see Course Requirements and Assessments on p.2.

5. **CUMULATIVE FINAL EXAM**
   This exam is comprehensive and will consists of all course materials and activities, including all assigned readings, discussions, text notes, and slide presentations etc.

**STUDENTS’ RESPONSIBILITIES**
A CUNY Portal ID and City Tech Email are required to gain access to Bb for assignments and to communicate in this course. Student training and assistance is located in the General Building room G600. Additionally, WebSupport1 has a beginners guide to Blackboard, and you may also see Bb help sections online.

**CLASSROOM CONDUCT**
- ✓ This class meets for only 50 minutes per week. It is imperative for students to arrive early in order to make full use of our time in class. The classroom door will therefore be closed after class has started.
- ✓ **CELL PHONE POLICY:**
  In order to maintain an environment conducive to learning, the use of cell phones, in class or lab is prohibited. Cell phones must be **Tumed OFF**, not just placed in silent mode. Ringing or vibrating phones are disruptive to teaching and learning. The instructor reserves the right to have the student removed from class. When a student is removed from class as a violation of this policy, this will be recorded as non-participating for the day and may adversely affect Course Active Participation grade, in consequence.
- ✓ Unnecessary talking is not permitted during instructor’s lectures or when another student is speaking.
- ✓ Food and drinks are not allowed in the classroom or labs at any time.
- ✓ If the chairs are moved during a session, please arrange them back to their regular positions before leaving class.
- ✓ Students are not permitted to leave the classroom **and return** during scheduled class sessions. (See Student Conduct Policy in the College Student Handbook). This includes during testing or group work.
- ✓ Although discussions and group learning are encouraged, originality and individual’s hard work will be recognized. Blind copying or “unacknowledged borrowing of intellectual work” is considered cheating and could result in an **“F” for the course.**

**ATTENDANCE POLICY**
No more than two absences will be allowed in this course. Each additional absence (excused or unexcused) will lower your course grade by one letter grade. This means that if your average is A and you were absent three times, the highest grade you can achieve is A-. And if you were absent 4 times, the highest grade you can achieve is B+. In general, students in the Rad Tech major must maintain grades that are above C.

NOTE: Detailed college attendance policy may be found in the college catalog.

LATENESS
Arrival 10 minutes after the scheduled start of class time will be counted as a lateness. Two late arrivals to class will be counted as one absence and may affect the final course grade.

NEW YORK CITY COLLEGE OF TECHNOLOGY POLICY ON ACADEMIC INTEGRITY
Students and all others who work with information, ideas, texts, images, music, inventions, and other intellectual property owe their audience and sources accuracy and honesty in using, crediting, and citing sources. As a community of intellectual and professional workers, the College recognizes its responsibility for providing instruction in information literacy and academic integrity, offering models of good practice, and responding vigilantly and appropriately to infractions of academic integrity. Accordingly, academic dishonesty is prohibited in The City University of New York and at New York City College of Technology and is punishable by penalties, including failing grades, suspension, and expulsion. The complete text of the College policy on Academic Integrity may be found in the catalog.
<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topic</th>
<th>Reading Assignment</th>
<th>Exam/Quiz</th>
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<tr>
<td>1</td>
<td>1/25</td>
<td>Medical Imaging History</td>
<td>Chap 2 &amp; 5</td>
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<tr>
<td>2</td>
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<td>Imaging Equipment &amp; Specialization</td>
<td>Chap 8 &amp; Chap 23</td>
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<td>Imaging Equipment &amp; Specialization Cont.</td>
<td>Chap 23 &amp; Chap 24</td>
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<td>2/15</td>
<td>Radiology Department: A Historical Perspective</td>
<td>Chap 15 &amp; 16 Bring #2 pencil &amp; Review Week 1 to 3.</td>
<td>Quiz #1 15 Quests</td>
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<td>The Health-Care Delivery System/Hospitals</td>
<td>Chap 4</td>
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<td>6</td>
<td>3/1</td>
<td>The Hospital Health-Care Team</td>
<td>Chap 15 &amp; 16 Bring #2 pencil &amp; Review 4 to 5</td>
<td>Quiz #2 15 Quests</td>
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<td>From Classroom to Clinic</td>
<td>Chap 6</td>
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<td>8</td>
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<td>Midterm Exam (Cumulative)</td>
<td>Bring #2 pencil &amp; Review Week 1 to 7</td>
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<td>Intro to Rad Protection</td>
<td>Chap 18</td>
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<td>Ethics &amp; Professionalism</td>
<td>Chap 11 &amp; 14</td>
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<td>11</td>
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<td>Intro to Principles of Diagnostic Imaging</td>
<td>Chap 10</td>
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<td>Intro to Patient Care</td>
<td>Chap 12 &amp; 13 Review Week 9 to 11</td>
<td>Quiz #3 20 Quests</td>
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<td>Professional Growth</td>
<td>Chaps 20, 21, 22 &amp; 25</td>
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<td>Professional Growth</td>
<td>Cont. &amp; Review for Final Exam</td>
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<td>Final Exam (Cumulative)</td>
<td>Bring a #2 pencil - Study all related Lectures &amp; reading assignments</td>
<td>Final Exam 50 Quests</td>
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Week

I. MEDICAL IMAGING HISTORY
   A. Introduction
   B. History of radiologic technology
   C. Radiation in medicine
   D. Opportunities in radiologic technology
      1. Imaging
      2. Administration
      3. Business and Industry

II. IMAGING EQUIPMENT & SPECIALIZATION
   A. Introduction
   B. Diagnostic imaging:
      1. Radiography
      2. Fluoroscopy
      3. CT
      4. Mammography
      5. Cardiovascular Interventional Technology
      6. MRI
      7. Ultrasound
      8. Nuclear Medicine
   C. Therapeutic procedures
      1. Radiation Therapy
      2. Interventional Procedures
   D. Biopsy procedures
   E. Introduction to medical abbreviations

III. IMAGING EQUIPMENT & SPECIALIZATION continued
   A. PET
   B. Bone densitometry
   C. PACS
   D. CR/Digital procedures
   F. Medical imaging terminology and references

IV. RADIOLOGY DEPARTMENT: A HISTORICAL PERSPECTIVE
   A. Introduction
   B. Organization and management
   C. Personnel positions
   D. Related workflow
   E. Radiology services
      1. Hospital
         a. Inpatient
         b. Outpatient
      2. Private office
      3. Imaging centers
   F. Radiology in today’s health-care system
   G. Medical terminology cont.
V. THE HEALTH-CARE DELIVERY SYSTEM/HOSPITALS
   A. Development of health-care
      1. Hospital organization
      2. Radiology organization
   B. Structure
      1. Development
      2. Three levels of care
   C. Hospitals
      1. Philosophy
      2. Mission statement
      3. Organization
   D. Other healthcare settings
   E. Management functions
      1. TQM
      2. QA/QC
   F. Regulating agencies and committees
      1. External
      2. Internal
   G. Medical terminology cont.

VI. THE HEALTH-CARE TEAM
   A. Introduction
   B. The health-care team
      1. Definition of the health-care team
      2. Radiographers role
   C. Professional relationships with the radiographer
      1. Physician
      2. Nurse
      3. Other members of the health-care team
   D. Changes in the health-care team
   E. Medical terminology cont.

VII. FROM THE CLASSROOM TO CLINIC
   A. Introduction
   B. Clinical rotations
   C. Resources
      1. Physical facilities
      2. Program officials
   D. Clinical education policies
      1. Hospital & School policies
   E. Progressive clinical development
   F. Methods of clinical evaluation

VIII. MIDTERM

IX. INTRODUCTION TO RADIATION PROTECTION
   A. Introduction
   B. Radiation units
   C. Sources of human exposure
   D. Biological concepts
   E. Radiation protection standards
F. Radiation protection procedures
   1. Time, distance, shielding
   2. Radiation protection devices
   3. Personnel monitoring
   4. ALARA
G. Medical terminology
   1. Root words
   2. Prefixes
   3. Suffixes

X. ETHICS & PROFESSIONALISM
A. Professional Ethics
B. Systems of law, Ethics and Morals
C. Ethical Evaluations
   1. Moral Issues
   2. Ethical Principles
   3. Ethical Judgment
D. Legal Issues in Radiology
E. Confidential vs. Non-confidential Information
F. Patient Care and inter-professional Relationships
   1. Patient Relationships
   2. Physician Relationships
   3. Relationships With Other Health Professionals
G. Radiographer’s Code of Ethics
H. Patient’s Bill of Rights
I. Types of consent
J. Related Terminology

XI. PRINCIPLES OF DIAGNOSTIC IMAGING
A. Introduction
B. Principles of radiographic exposure
   1. Definition of x-rays
   2. Basic exposure factors
      a. mA, time, kVp, and SID
      b. Radiographic quality
      c. Visual elements
      d. Geometric elements
C. Body positions
   1. Body planes
   2. Body positions

XII. INTRODUCTION TO PATIENT CARE
A. Introduction
B. Patient assessment
C. Vital signs
   1. Blood pressure
   2. Temperature
   3. Respiration
   4. Pulse
D. Medication and administration
E. Documentation
   1. X-ray requisition
   2. Patient chart
   3. Radiographs
F. Patient education
G. Medical terminology cont.
XIII. PROFESSIONAL GROWTH
A. Introduction
B. Environment
C. JRCERT (Complaint Procedure & Form)
D. Certification of individuals
   1. Certification
   2. ARRT
      a. Radiography
      b. Advanced categories
   3. State license
E. Professional societies
F. Work Related stress

XIV. PROFESSIONAL GROWTH
A. Radiography practice standards
B. ARRT continuing education
C. Medical terminology cont.
D. Review for Final Exam

XV. FINAL EXAM
Week 1
Condition: Lecture, discussion and assigned reading which introduces students to the profession of radiologic technology.
Learning Outcomes: At the end of the lecture, the student will be able to:
1. Explain the use of radiation in medicine and describe the discovery of x-rays.
2. Define terms related to radiologic technology.
3. List the many diagnostic and therapeutic procedures in medical imaging.
4. Differentiate the many career opportunities and various specialties in radiography.

Week 2
Condition: Lecture discussion and assigned reading on the various types of imaging equipment in the Radiology profession.
Learning Outcomes: At the end of the lecture, the student will be able to:
1. Identify the various types of imaging modalities in medicine.
2. Differentiate between diagnostic and therapeutic procedures.
3. Define fluoroscopic imaging.
4. Discuss the role of radiology in biopsy procedures.
5. Identify Medical Abbreviations

Week 3
Condition: This lecture is a continuation of the various imaging equipment and procedures in Radiology, as well as the role of computers in radiology.
Learning Outcomes: At the end of the lecture, the student will be able to:
1. Differentiate between the various imaging procedures available.
2. Indicate when a specific imaging modality is required.
3. Define what is meant by digital procedures.
4. Describe the role of computers in radiologic imaging.
5. Discuss the role of computers in image archiving and reporting systems.
6. Define specific assigned Medical Terminology

Week 4
Condition: Lecture, discussion, assigned reading and homework on the evolution of radiology within the hospital setting.
Learning Outcomes: At the end of the lecture, the student will be able to:
1. Describe the changes to the radiology department since the 1960's.
2. Identify and discuss the organizational structure of a radiology department.
3. Describe the role of a radiology administrator.
4. Explain how radiology is thought of as a business.
5. Identify high volume areas within a radiology department.
6. Define specific assigned Medical Terminology

Week 5
Condition: Lecture, discussion, assigned reading and homework on the health-care delivery system and the hospital environment.
Learning Outcomes: At the end of the lecture, the student will be able to:
1. Discuss the structure of the health-care system.
2. Identify the three levels of care.
3. Discuss the philosophy of a hospital organization.
4. Define the principles of a mission statement in a hospital.
5. List basic management principles.
6. Define TQM and QA/QC.
7. Differentiate between internal and external regulating agencies.
8. Define specific assigned Medical Terminology
Week 6
Condition: Lecture, discussion, assigned reading and homework on the hospital health-care team.
Learning Outcomes: At the end of the lecture, the student will be able to:
1. Discuss the components of the hospital health-care team.
2. Define the role of the radiographer in health-care.
3. Identify the relationships of various health-care workers to radiographers.
4. Discuss the role of physician’s in radiology.
5. Identify recent changes in the health-care team.
6. Define specific assigned Medical Terminology

Week 7
Condition: Lecture, discussion, assigned reading and homework on the clinical education component.
Learning Outcomes: At the end of the lecture, the student will be able to:
1. Define terms that relate to the clinical education of the radiologic technologist.
2. Describe the physical and human resources necessary for effective clinical education.
3. List and explain hospital and school clinical policies.
4. Discuss the importance of adhering to clinical education policies.
5. Summarize the clinical education process.
6. Describe the methods in which the student is evaluated in the clinical setting.
7. Define specific assigned Medical Terminology

Week 8
Midterm Exam

Week 9
Condition: Lecture, discussion, assigned reading and homework on the basic principles of radiation protection.
Learning Outcomes: At the end of the lecture, the student will be able to:
1. List the basic units of measure of radiation.
2. List the types of radiation exposure to man.
3. Describe the biological basis of radiation exposure.
4. Define ALARA.
5. Describe techniques of radiation safety.
6. Define specific assigned Medical Terminology

Week 10
Condition: Lecture, discussion, assigned reading and homework on the ethical, moral and legal issues involved in the radiologic technology profession.
Learning Outcomes: At the end of the lecture, the student will be able to:
1. Differentiate between the systems of ethics, law and morals.
2. Describe the Radiographer’s Code of Ethics.
3. Recognize values associated with ethical decision-making in the practice of radiologic technology.
4. List the key components of patient medical records.
5. Differentiate between confidential and non-confidential information.
6. Discuss how standard of care is established for radiologic technologists.
7. Define specific assigned Medical Terminology.

Week 11
Condition: Lecture, discussion, homework and assigned reading on the basic principles involved in the production of a radiograph.
Learning Outcomes: At the end of the lecture, the student will be able to:
1. Describe how x-rays are produced.
2. Identify the four basic exposure (technical) factors: mA, kVp, time and SID.
3. Define recorded detail and image quality.
4. Describe the elements of density and contrast.
5. Identify basic anatomy on radiographic images.
6. List the body planes and positions.
**Week 12**

**Condition:** Lecture, discussion, assigned reading and homework on the basic practice of correct patient care skills in radiology.

**Learning Outcomes:** At the end of the lecture, the student will be able to:
1. Discuss basic patient assessment techniques.
2. Describe the normal range of patient vital signs.
3. List the principles of medication administration.
4. Define the fundamentals of documentation techniques.
5. Discuss patient education methods.
6. Define specific assigned Medical Terminology

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**Week 13**

**Condition:** Lecture, discussion, assigned reading and homework on the professional role of the radiographer in health-care.

**Learning Outcomes:** At the end of the lecture, the student will be able to:
1. Define the term professionalism.
2. Discuss how radiographers present themselves to other health-care professionals and the public.
3. Discuss the role of the radiographer in health-care today.
4. Describe the role of the JRCERT and discuss complaint form and procedure.
5. List professional societies for radiographers and their purpose.
6. Discuss ways in which a healthcare worker may reduce stress.

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**Week 14**

**Condition:** Lecture, discussion, assigned reading and homework on the professional role of the radiographer in health-care.

**Learning Outcomes:** At the end of the lecture, the student will be able to:
1. Discuss the Radiography Practice Standards.
2. Discuss continuing education for radiographers.
3. Define specific assigned Medical Terminology
4. Review for Final Exam

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**Week 15**

**Final Exam**