RADS 2223 (RADR 2431)  
**ADVANCED RADIOGRAPHIC PROCEDURES**

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**COURSE DESCRIPTION** - An advanced course including the proper manipulation of equipment; positioning and alignment of the anatomical structure and equipment; and evaluation of images for proper demonstration of advanced anatomy and related pathology.

**LEARNING OUTCOMES**

<table>
<thead>
<tr>
<th>The student will:</th>
<th>SCANS Competencies</th>
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<tbody>
<tr>
<td>master the manipulation of the equipment</td>
<td>1, 3, 4, 5, &amp; 7</td>
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<tr>
<td>master the positioning and alignment of anatomical structures &amp; equipment</td>
<td>1, 3, 4, 5, &amp; 7</td>
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<tr>
<td>evaluate images for proper demonstration of anatomy &amp; pathology</td>
<td>1, 3, 4, 5, &amp; 7</td>
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**TEXTBOOKS**

2. Introduction to Radiography and Patient Care, 4th Ed., by Adler & Carlton  
3. Patient Care in Radiography, 7th Ed., by Ehrlich & Daly  

**ATTENDANCE POLICY** - Attendance is mandatory. Excessive absences will result in a referral to the Dean of the College of Health Sciences, and may result in your being dropped from the Program. Excessive absences are defined as: More than 3 absences from lecture (except medical reasons). **Missed quizzes may only be made up if prior arrangements are made.**

**ACADEMIC DISHONESTY POLICY** - Academic dishonesty (cheating, plagiarism, etc.) will not be tolerated in this class and may result in suspension or dismissal from this course and from the program. Cases will also be referred to the Dean of Students for possible dismissal from the university.

**Student Honor Creed:** "As an MSU Student, I pledge not to lie, cheat, steal, or help anyone else to do so."

**Cheating** includes, but is not limited to, (1) use of any unauthorized assistance in taking quizzes, tests, or examinations; (2) dependence upon the aid of sources beyond those authorized by the instructor in writing papers, preparing reports, solving problems, or completing other assignments; or (3) the acquisition of tests or other academic materials belonging to the university faculty or staff without permission.

**Plagiarism** includes, but is not limited to, the use of, by paraphrase or direct quotation without correct recognition, the published or unpublished works of another person. The use of materials generated by agencies engaged in "selling" term papers is also plagiarism.

**PARTICIPATION** - All students are expected to fully participate in all class activities, including lectures and discussions, demonstrations, presentations, small-group projects, and collaborative learning activities.

**PROFESSIONALISM** - At all times, students are expected to conduct themselves in a professional manner. Professionalism includes establishing positive relationships and interactions with peers, colleagues, and faculty; attending respectfully to others who are sharing information with the class; being flexible to
unforeseen changes in schedules and assignments; and, being prepared for all class meetings. Part of being a professional is learning to follow the “chain of command”. In the event that there is a dispute between the instructor and the student and the student is not satisfied with the resolution, the student is to appeal to the Program Chair. From there the next link in the chain is the Dean and so forth as stipulated in the student handbook.

**AMERICANS WITH DISABILITIES ACT (ADA)** - The Radiologic Technology Program at Midwestern State University complies with the ADA in making reasonable accommodations for qualified students with disabilities. If you have an established disability as defined in the ADA and would like to request accommodations, please see the instructor as soon as possible.

**Exams & Quizzes** - You will be required to use Scantron answer sheets for all quizzes & Exams. If you change an answer you must do the following:

1) Erase the incorrect answer completely,
2) Blacken in your new choice,
3) In the margin next to the change, write the letter for your new choice,
4) When you turn your test in, tell me about the change & I will initial it.

**IF ANY OF THE PRECEDING STEPS ARE NOT FOLLOWED, YOUR TEST GRADE WILL BE AS MARKED BY THE SCANTRON MACHINE!**

**Assignments** - [Create a Patient Education Brochure](#)
Due Date: April 1, 2011 12:00 PM
Late Submissions: accepted until April 8, 2011, 12:00 PM. A 10% penalty will be assessed.

In a perfect world, the referring physician would educate the patient on the procedure they are being referred for. We don't live in a perfect world & patient education tends to fall on our shoulders.

Create a patient education brochure for one of the procedures that we will be discussing in this course.

**Requirements:**

- It must be saved to a Microsoft Office-compatible format.
- You may use Word, Publisher, or PowerPoint.
- It can be formatted as a plain handout sheet (2 panels), bi-fold (4 panels), or a tri-fold (6 panels).
- Get your creative juices flowing!

**Grading:**

You will be graded on the content (accuracy & completeness), creativity, & mechanics (spelling, punctuation, sentence structure, etc.).

**Submission:**

Submit the file as directed on the Blackboard assignment page.
GRADING –

The final course grade will be calculated by the following criteria:

- Tests ............... 40%
- Assignment ........ 10%
- Midterm ............ 25%
- Final .............. 25%

The grading scale will be:

- 89.5 - 100 = A
- 79.5 - 89.4 = B
- 74.5 - 79.4 = C
- 60.5 - 74.4 = D
- 0.0 - 60.4 = F

TENTATIVE CLASS SCHEDULE

Jan. 18 ................................................................................................................ Introduction, Fluoroscopy
20 .................................................................................................................. Fluoroscopy (continued)
25 ................................................................................................... Fluoroscopy (continued & review)
27 ........................................................................................................ Contrast Media

Feb. 1 ................................................................................................... TEST 1 - Fluoro, Contrast Media
3 ..................................................................................................................... Digestive System
8 ........................................................................................................ TEST 2 – Contrast Media, Digestive System
10 ...................................................................................................... Digestive System (continued)
15 .................................................................................................. TEST 3 – Alimentary Tract & Sialography, Biliary System (continued)
17 ................................................................................. Digestive System (continued), Biliary System (continued)
22 ........................................................................................................ TEST 4 – Biliary System, Urinary System
24 ............................................................................................................. Urinary System (continued)

Mar. 1 ............................................................................................................. Urinary System (continued)
3 ............................................................................................................. Urinary System (continued)
8 ................................................................................................................ TEST 5, Midterm Review
10 .............................................................................................................. MIDTERM EXAMINATION

11-12 ................................................................................................... TSRT – Brookhaven College
15 & 17 ....................................................................................................... SPRING BREAK – NO CLASSES,
22 ........................................................................................................ Misc. Rad. Proc: Arthrography, Myelography
24 ........................................................................................................ Misc. Rad. Proc: Bronchography, Hysterosalpingography
29 ........................................................................................................ TEST 6 (Arthrography & Myelography), Misc. Rad. Proc: Lymphangiography
31 ......................................................................................................... TEST 7 (Bronchoangiography & Hysterogram) Digital Subtraction Angiography (DSA)

April 1 ............................................................................................................. Assignment upload in Blackboard due by 12:00 pm (noon)
5 ............................................................................................................... Cardiovascular Anatomy
7 ............................................................................................................. Cardiovascular Anatomy (continued)
8 ............................................................................................................. Late assignment submissions due by 12:00 pm (noon)
12 ............................................................................................................. Cardiovascular Procedures
14 ........................................................................................................ Cardiovascular Procedures (continued)
19 ........................................................................................................ Cardiovascular Procedures (continued)
21 ....................................................................................................... EASTER BREAK – NO CLASSES
26 ........................................................................................................ Cardiovascular Procedures (continued)
28 ....................................................................................................... TEST 8 (Lymphography, DSA, & CV)

May 3 ............................................................................................................. Other Imaging Modalities
5 ............................................................................................................... Semester Review
12 ............................................................................................................. Final Examination at 8:00 am
OBJECTIVES & READING ASSIGNMENTS


1. Discuss the development of fluoroscopy.
2. Define image intensified fluoroscopy.
3. Given an illustration of an image intensifier, label the components and state their purpose.
4. Identify the function of an image intensifier.
5. Discuss gain and conversion factors as related to intensification.
6. Calculate minification gain and brightness gain.
7. Describe the optical system of an image intensifier.
8. Discuss image formation in terms of image size, framing, and brightness.
9. Identify proper radiation protection procedures for the fluoroscopic environment.
10. Discuss applications of image intensified fluoroscopy.
11. Discuss each of the following in terms of purpose, construction, and application:
   A. Video tubes
   B. Cine radiography equipment
   C. Roll/Cut film camera
   D. Automatic film/cassette changers
   E. Video recorders

12. Discuss each of the following in terms of purpose, equipment/film, and procedure:
   A. Duplication
   B. Subtraction
   C. Magnification

**CONTRAST MEDIA:** Adler & Carlton pp. 306-343, Ehrlich & Daly pp. 312-320. Merrill’s (V.2) pp. 241-251

1. Describe the need for utilizing contrast agents.
2. Differentiate between ionic and non-ionic contrast agents.
3. State the importance of proper patient preparation.
4. Describe the type, signs and symptoms associated with a contrast agent reactions.
5. Describe the following characteristics of contrast agents to include:
   a. viscosity
   b. toxicity
   c. opacity
   d. miscibility

6. Identify the types of contrast agents pertaining to the following systems:
   a. biliary
   b. cardiovascular
   c. gastrointestinal
   d. hysterosalpingography
   e. lymphangiography
   f. myelography
   g. pulmonary
   h. sialography
   i. urinary tract

7. Identify the major groupings of contrast agents to include the following:
   a. soluble ionic
   b. soluble non-ionic
   c. non-injectable
   d. radiolucent

8. Identify the classification of contrast agent reactions and the symptoms seen.


1. Discuss equipment and supplies necessary for each exam.
2. Describe the patient preparation necessary for each exam.
3. Describe the general procedure for each exam.
4. List and describe the routine and special views for each study.
5. List the common contrast media used, usual dosage and route of administration.
6. For each procedure, list and identify the structures and/or function.
7. Given radiographs, identify and evaluate related anatomy, centering, positioning and overall image quality.
**BILIARY SYSTEM:**  
*Ch. 16 - 91-117 (V.2). Ehrlich & Daly pp. 323-326.*

1. State the function of the biliary system.
2. Identify the major anatomical structures of the following:
   a. liver  
   b. gallbladder  
   c. pancreas  
   d. spleen
3. Describe the radiographic exams performed to demonstrate the following:
   a. liver  
   b. gallbladder  
   c. pancreas  
   d. spleen
4. Identify the common pathologies, contrast media, and patient preparation for the following exams:
   a. Oral Cholecystography (OCG)  
   b. Intravenous cholangiography (IVC)  
   c. Percutaneous transhepatic cholangiography  
   d. Operative cholangiography  
   e. Endoscopic retrograde cholangiopancreatography (ERCP)
5. Identify the necessary projections/positions employed by the technologist to demonstrate the following anatomy:
   a. liver  
   b. spleen  
   c. gallbladder
6. Identify the radiologic apparatus available to the technologist as well as the radiologist and how to prepare the x-ray room for the patient.

**URINARY SYSTEM:**  
*Ch. 18 - 195-240 (V.2). Ehrlich & Daly pp. 321-323.*

1. State the functions of the urinary system.
2. Identify the anatomy of the following:
   a. kidney  
   b. ureter  
   c. bladder  
   d. urethra
3. Describe the radiographic exams performed to demonstrate the following:
   a. kidney  
   b. ureter  
   c. bladder  
   d. urethra
4. Identify or otherwise define the pathology, contrast media to visualize, and patient preparation for the following:
   a. kidney  
   b. ureter  
   c. bladder  
   d. urethra
5. Identify the following variables associated with the urinary system.
   a. exposure techniques  
   b. evaluation criteria  
   c. immobilization  
   d. radiation protection  
   e. patient preparation

**SP. RAD. STUDIES:**  
*Bronchography - Ch. 10 - 499-541 (V.1), Arthrography - Ch. 12 - 7-19 (V.2), Reproductive System - Ch. 19 - 253-272 (V.2), Ch. 24 - 1-18 (V.3). Ehrlich & Daly pp. 327-332.*

1. Discuss equipment and supplies for each of the following studies:
   a. Bronchography  
   b. Arthrography  
   c. Reproductive System  
   d. Myelography
2. Describe patient preparation necessary for each exam.
3. Describe general procedure for each exam.
4. Describe the process for routine and special views for each exam.
5. Given the names of various exams, indicate the contrast media typically used, usual dosage and route of administration.
6. Given radiographs, evaluate positioning, centering, overall image quality, relevant anatomy, structures and/or functions.

**ARTERIOGRAPHY:**  
*Ch. 25 - 19-117 (V.3); Carlton - Ch. 43 - 628-640. Ehrlich & Daly pp. 356-364.*

1. List and describe the duties of the:
   a. physician  
   b. nurse  
   c. special procedures technologist  
   d. orderly/darkroom technician
2. List the contrast media in angiography.
3. List and describe the injection techniques.
4. Discuss the equipment in a special procedures room.
5. Explain the Seldinger technique.
6. Discuss catheters used.
7. Discuss patient care.
8. Discuss and describe the following examinations:
   a. Aortography:
      1) Thoracic aorta  2) Abdominal aorta
   b. Pulmonary arteriography
   c. Selective abdominal visceral:
      1) Celiac  2) Hepatic  3) Splenic
      4) Superior Mesenteric  5) Inferior Mesenteric  6) Renal
   d. Peripheral angiography:
      1) Upper limb  2) Lower limb (aortofemoral runoff)
   e. Cerebral
   f. Venography
      1) Peripheral  2) Central
   g. Lymphography
9. Discuss radiation protection.