A study of the equipment and physics of x-ray production, basic x-ray circuits, and the relationship of equipment components to the imaging process.

The student will be able to describe the basic physics of x-ray production and explain the operation and role of each component of the imaging chain.

The Secretary’s Commission on Achieving Necessary Skills (SCANS) was established to determine skills that a student needs in order to succeed in the work environment. These skills are: 1) Basic Skills, 2) Thinking Skills, 3) Personal Qualities, 4) Resources, 5) Interpersonal Skills, 6) Information, 7) Systems, and 8) Technology.

Upon completion of this course the student will be able to:

1. Perform mathematical calculations pertinent to this course. (1,2,4,6)
2. Describe basic atomic theory and the various forms of energy. (1,2,4,6)
3. Define basic physics related terms. (1,6)
4. Describe and apply the basic concepts of electricity and electromagnetism. (1,2,3,4,6,8)
5. Identify and explain the role of various parts of the x-ray circuit and types of x-ray equipment. (2,3,5,6,7,8)
6. Discuss the x-ray production process and x-ray interactions with matter. (2,3,6)
7. Describe the construction, characteristics, and care of radiographic film, screens, and cassettes. (1,2,3,5,7,8)
8. Describe the following as they relate to the automatic processor: chemicals, systems, maintenance, and artifacts. (1,2,3,4,5,6,7,8)
9. Recognize the need and benefits of silver recovery from the processor. (1,2,3,6,7,8)
10. Discuss alternative processing methods. (1,2,3,5,6,7,8)

Your textbook contains chapter specific objectives that should be reviewed, with the chapter, prior to discussion of the material and as a guide to prepare for quizzes.
TEACHING STRATEGIES: Lecture, laboratory experiences, group activities, student presentations (with peer and self-assessment), and demonstrations.

ATTENDANCE POLICY: Attendance and being on time is mandatory. Excessive absences will result in a referral to the Dean of Students, and may result in your being dropped from the Program. Excessive absences are defined as: More than 3 unexcused absences from lecture AND/OR lab. MISSED QUIZZES & LABS 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.

By enrolling in this course, the student expressly grants MSU a “limited right” in all intellectual property created by the student for the purpose of this course. The “limited right” shall include but shall not be limited to the right to reproduce the student’s work product in order to verify originality and authenticity, and for educational purposes.

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.

AMERICANS WITH DISABILITIES ACT (ADA): The Radiologic Sciences 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.

SCANTRON POLICY - 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!

GRADING: Labs = 20%  89.5 – 100 = A
Quizzes = 30%  79.5 – 89.4 = B
Midterm = 25%  74.5 – 79.4 = C
Final = 25%  59.5 – 74.4 = D
59.4 & Less = F
<table>
<thead>
<tr>
<th>Lecture Date</th>
<th>Reading Assign. Carlton &amp; Adler 4th Ed.</th>
<th>LECTURE TOPIC</th>
<th>Lab Date</th>
<th>LAB TOPIC/ASSIGNMENT</th>
<th>INSTRUCTOR</th>
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</thead>
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| Aug 23      | Chap. 1 & 2                          | Radiation Concepts | Mon Aug 22  
Wed Aug 24 | Math Review / workbook problems | Wilbanks     |
| Aug 30      |                                      | Radiation Concepts | Mon Aug 29  
Wed Aug 31 | Math Review / workbook problems | Wilbanks     |
| Sept 6      | Chap 3 & 4                           | Quiz 1 (on Radiation Concepts) Begin Electricity & Magnetism | NO LAB Mon Sept 5  
Wed Sept 7  
Mon Sept 12 | Circuit calculations | Wilbanks     |
| Sept 13     |                                      | Electricity & Magnetism | Wed Sept 14  
Mon Sept 19 | Rectifiers and Transformers | Wilbanks     |
| Sept 20     | Chap 5, 6, & 41                      | Quiz 2 (on Electricity & Magnetism) Begin X-ray Circuits, Generators & Equipment | Wed Sept 21  
Mon Sept 26 | Circuit workbook 5-1  
Tube support evaluation | Wilbanks     |
| Sept 27     |                                      | X-ray Circuits, Generators & Equipment | Wed Sept 28  
Mon Oct 3 | X-ray tube lab  
Tube rating chart practice | Wilbanks     |
| Oct 4       |                                      | Quiz 3 Review for Midterm | Wed Oct 5  
Mon Oct 10 | LAB MIDTERM | Wilbanks     |
| Oct 11      |                                      | MIDTERM EXAM | NO LABS | NO LABS | Wilbanks     |
| Oct 18      | Chap 7 & 12                          | Begin X-ray Production & Interactions | Wed Oct 19  
Mon Oct 24 | Workbook 7-1, answer prior to lab.  
Will discuss in lab | Morrison     |
| Oct 25      |                                      | X-ray Production & Interactions | Wed Oct 26  
Mon Oct 31 | Workbook 12-1 answer prior to lab.  
Illustrating factors affecting emission spectrum | Morrison     |
| Nov 1       | Chap 19 & 21                         | Quiz 4 (on X-ray production & Interactions) Begin Radiographic Film | Wed Nov 2  
Mon Nov 7 | H&D Curve plot with sensitometric strip, Run first strip for processor lab. | Morrison     |
| Nov 8       |                                      | Radiographic Film | Wed Nov 9  
Mon Nov 14 | Screen artifact experiment.  
Run 2nd strip for processor lab. | Morrison     |
| Nov 15      | Chap 20, 24, & 25                    | Quiz 5 (on Radiographic Film) Begin Image Processing | Weds Nov 16  
Mon Nov 21 | Processor systems and parts  
(workbook 30-1), lab experiment 2 (3rd strip and lab worksheet) | Morrison     |
| Nov 22      |                                      | Image Processing | Weds Nov 23 | NO LAB - Thanksgiving | Morrison     |
| Nov 29      |                                      | Quiz 6 Review for Final | Mon Nov 29  
Wed Dec 1 | LAB FINAL | Morrison     |
| Dec 2-8     |                                      | *Finals Week | NO LABS | NO LABS | Morrison     |

SUBJECT TO CHANGE WITHOUT PRIOR NOTICE!