North Central State College

MASTER SYLLABUS	2025-2026

A. Academic Division: Health Science

B. Discipline: Radiological Sciences

C. Course Number and Title: RADS2460 Imaging Science 4

D. Assistant Dean: Heidi Kreglow, PT

E. Credit Hours: 3
Lecture: 2
Laboratory: 3

F. Prerequisites: RADS 2340
Co-requisites: RADS 2440(m)

G. Last Course/Curriculum Revision Date: Fall 2023 Origin date: 2/11/2015

H. Textbook(s) Title:

Principles of Radiographic Imaging
- Author: Carlton / Adler
- Copyright Year: 2019
- Edition: 6th
- ISBN #: 978-133-771-167

Radiologic Science for Technologist
- Author: Stewart Bushong
- Copyright Year: 2021
- Edition: 12th
- ISBN: 9780323661348

Radiographic Image Analysis
- Authors: McQuillen
- Copyright Year: 2024
- Edition: 6th
- ISBN: 9780323930697

RadTechBootCamp - Clover Learning Student Plan, electronic resource
- Vendor: Clover Learning Inc.
- Copyright Year: 2023
- Edition: n/a
- ISBN: 9781951294038

I. Workbook(s) and/or Lab Manual: None

J. Course Description: This course is designed to establish a knowledge base of radiographic and fluoroscopic equipment design. The nature and characteristics of radiation, x-ray production, and photon interaction with matter are also included. Image analysis is included with the importance of optimal imaging standards. The lab setting will permit application of these skills.

K. College-Wide Learning Outcomes:

College-Wide Learning Outcome	Assessments - - How it is met & When it is met
Communication – Written	
Communication – Speech	
Intercultural Knowledge and Competence	
Critical Thinking	Critical Thinking VALUE Rubric – Week 12-14
Information Literacy	
Quantitative Literacy	

L. Course Outcomes and Assessment Methods:

Upon successful completion of this course, the student shall:

Outcomes	Assessments – How it is met & When it is met
1. Identify the basic terms and vocabulary associated with electricity and electromagnetism.	Test - Week 3-4
2. Diagram and explain the components / function of the x-ray circuit.	Test Week 5-6
3. Diagram and explain the components / function of the x-ray tube.	Test Week 7-8
4. Compare and contrast the shape of the x-ray emission spectrum as one variable changes.	Test Week 7-8
5. Differentiate between target interactions and tissue interactions.	Test Week 9-10
6. Diagram and explain the components / function of the image intensifier.	Test Week 11-12
7. Describe the various components / function of a CT imaging system.	Test Week 11-12
8. Define various terms associated with CT	Test Week 13-14
9. Identify various cross-sectional anatomical structures.	Test Week 13-14
10. Evaluate non-diagnostic images with regard to image quality and evaluation criteria.	Classroom activity worksheets Weeks 2, 4, 6, 8, 10, Critical Thinking rubric Week 12.
11. Perform and interpret various QC tests.	Lab exercises Weeks 13-15

M. Recommended Grading Scale:

NUMERIC	GRADE	POINTS	DEFINITION
93–100	A	4.00	Superior
90–92	A-	3.67	Superior
87–89	B+	3.33	Above Average
83–86	B	3.00	Above Average
80–82	B-	2.67	Above Average
77–79	C+	2.33	Average
73–76	C	2.00	Average
70-72	C-	1.67	Below Average
67–69	D+	1.33	Below Average
63-66	D	1.00	Below Average
60-62	D-	0.67	Poor
00-59	F	0.00	Failure

N. College Procedures/Policies:

North Central State College believes that every student is a valued and equal member of the community.* Every student brings different experiences to the College, and all are important in enriching academic life and developing greater understanding and appreciation of one another. Therefore, NC State College creates an inclusive culture in which students feel comfortable sharing their experiences. Discrimination and prejudice have no place on the campus, and the College takes any complaint in this regard seriously. Students encountering aspects of the instruction that result in barriers to their sense of being included and respected should contact the instructor, assistant dean, or dean without fear of reprisal.

* *Inclusive of race, color, religion, gender, gender identity or expression, national origin (ancestry), military status (past, present or future), disability, age (40 years or older), status as a parent during pregnancy and immediately after the birth of a child, status as a parent of a young child, status as a foster parent, genetic information, or sexual orientation*

Important information regarding College Procedures and Policies can be found on the syllabus supplement located at

https://ncstatecollege.edu/documents/President/PoliciesProcedures/PolicyManual/Final%20PDFs/14-081b.pdf

North Central State College

SYLLABUS ADDENDUM

Academic Division:	Health Science		**Discipline:**	Radiological Sciences
Course Coordinator:	Heidi Chambers			
Course Number:	RADS 2460		**Course Title:**	Imaging Science 4
Semester / Session:	Fall 2025 – 16-week Course		**Start / End Date:**	Aug 12th-Dec 12th

Instructor Information

Name:	Heidi Chambers		**Credentials:**	BRST, R.T. (R)
Phone Number:	419-755-4809		**E-Mail Address:**	hchambers@ncstatecollege.edu
Office Location:	152 Health Science Building		**Office Hours:**	By appointment, in person or via zoom Tues 2p-4p; Wed: 11a-12p; Thurs 12p-2p

I. Topical Timeline / Course Calendar (Subject to Change):

Weeks	Topics	Assignment	Due Date
1	Radiation Science Concepts and Basic Physics	CN 1 Note Packet Class Review, Lab	Aug 11 Aug 12
2	Structure of Matter	CN 2 Note Packet Class Review, Lab	Aug 18 Aug 19
3	Electromagnetic Energy	CN 3 Note Packet Class Review, Lab **Test 1** (CN 1 and 2)	Aug 25 Aug 26 Aug 26
4	Electricity, Magnetism, and Electromagnetism	CN 4/ Part 1 Note Packet Class Review, Lab	Sept 1 Sept 2
5	Electricity, Magnetism, and Electromagnetism	CN 4/ Part 2 Review Questions Class Review, Lab **Test 2** (CN 3, some CN 1 & CN 2)	Sept 8 Sept 9 Sept 9
6	X-ray Imaging System	CN 5 Note Packet Class Review, Lab	Sept 15 Sept 16
7	X-ray Imaging System	RTBC Lessons and Quizzes, Class Review, Lab and worksheet	Sept 22 Sept 23
8	X-ray Tube	CN 6 Note Packet Class Review and Lab **Test 3** (CN 4)	Sept 29 Sept 30 Sept 30
Fall Break Oct 6th - Oct 10th			
9	X-ray Tube	RTBC Lessons and Quizzes Class Review, Lab and worksheet	Oct 13 Oct 14
10	X-ray Production	CN 7 Note Packet; RTBC Class Review, Lab **Test 4** (CN 4)	Oct 20 Oct 21 Oct 21
11	X-ray Emission and Filtration	CN 8 Note Packet, RTBC Class Review, Lab and Worksheet	Oct 27 Oct 28
12	X-ray Interactions with Matter	CN 9 Note Packet; RTBC Class Review, Lab and Worksheet	Nov 3 Nov 4
13	**Veteran's Day; No Class**		Nov 11
14	Fluoroscopic Equipment	CN 10 Note Packet; RTBC Class Review. Lab and Worksheet	Nov 11 Nov 12
15	Digital Display Device and QC Management	CN 11 Note Packet; RTBC Class Review and Lab **Test 5** (CN 6, CN 7 & CN 8)	Nov 17 Nov 18
16	Review for Comprehensive Final	**Test 6** (CN 9, CN 10, CN 11)	Nov 25
17	Comprehensive Final in person on campus	Comprehensive Final	Dec 9

NOTE: All assignments, assignment dates and lab activities are subject to change. All modifications will be communicated in a Canvas announcement.

II. Grading and Testing Guidelines:

Final Grade Calculation

Activity	Qty	Points	Percentage
Exams	6	350	**60%**
Final Exam	1	115	**20%**
Lab			**10%**
• Attendance	15 x 2	30	
• Dress code	15 x 2	30	
• Worksheets		Varies	
• Experiments		Varies	
Other graded items			**10%**
• Class attendance			
• Note packet assignments		Varies	
• RTBC video lessons and quizzes		Varies	
• Review questions and worksheets		Varies	

Note: Minimum Course Grade
The Radiological Department believes that a grade below C+ indicates a lack of mastery of essential skills. Therefore, any student who receives less than C+ in any Radiological Science sequence course cannot continue in the Radiology Program.

III. Examination Policy:

1. Students must attend class when tests, oral presentations, and written assignments are scheduled. If the student does not attend class on these days the following deductions will be applied:
   - 1st missed test → minus 10% from the earned score
   - 2nd missed test → minus 15% from the earned score
   - 3rd missed test → minus 20% from the earned score
   - Additional missed tests → result in a zero score
2. A student who arrives late to class for a test for any reason may not be permitted to take the test at that time. The test will be treated as a make-up exam with appropriate deduction from the earned score:
   - Late arrival for any exam → minus 10% from the earned score
3. The reasons for which a student may be excused from taking an examination, oral presentations, assignments or lab and not receive a deduction in score are as follows:
   - Hospitalization (with documented verification)
   - Death in the immediate family (with documented verification)
   - Personal illness or illness in immediate family - (doctor's excuse required).
4. Any student who misses an examination (for any reason) is responsible for contacting the instructor prior to the start of class or examination through Canvas to let the instructor know the reason of absence and schedule the make-up test. Make-up exams are scheduled as close as possible to the missed test date and should occur no later than one week from the missed exam. In cases of **extreme** illness or hospitalization contact should be made no later than 24 hours from the date of absence. If the student does not contact the instructor within the allotted time, the student may be subjected to a zero on the examination. The instructor will not "chase down" the student to reschedule.
5. No makeup opportunity will be given for absences of unscheduled quizzes (pop quizzes).

6. Exams are administered via the Canvas course and are proctored over Zoom. The student must use two devices (phone and computer) while faculty proctor the examination. Each exam creates a real-time log of the student's activities while in the exam. Navigation away from the exam tab during the examination is not permitted for any reason. Exam logs are randomly checked by faculty after each test. Any student who navigates one time from the exam will receive a zero and a written warning. If a student navigates from the exam more than once, the student will receive a zero on the test and subjected to the college's academic misconduct process.

7. Any student who scores below a 77% on any examination is **required** to schedule a one on one meeting with the instructor to identify knowledge gaps of the material. The student may be mandated tutoring. The student should not view this as a punishment and view it as a benefit to be as successful as they can be in the program.

IV. Class/Lab Attendance and Homework Make-Up Policy:

1. Class attendance is necessary to acquire the knowledge required to be successful in the course. Student attendance is taken and part of the final course grade.

2. Students are responsible for attending every online Zoom class. Classes will meet once a week with a link to the class provided in the Canvas course.

3. In any circumstance where a student will miss an online class, the student must send a message to the instructor through Canvas **prior** to the start of the class. If a student is absent due to illness, the student is not permitted to attend lab for that day. If the student is absent and does not contact the instructor, the student is not permitted to attend lab for that day.

4. Attendance is taken for lab and students must attend all scheduled labs. The student will receive 2 points for each lab attended and 2 points for following the dress code requirement. If the student missed lab, 4 points are deducted. If the student is late, 2 points are deducted. If the student violates the dress code, 2 points are deducted. If the student is late and in violation of dress code for that day, 4 points are deducted.

5. The reasons for which a student may be excused from class and/or lab without a deduction are as follows:
    - Hospitalization (with documented verification)
    - Death in the immediate family (with documented verification)
    - Personal illness or illness in immediate family - (doctor's excuse required).

6. Homework and other assignments only receive full credit when they are submitted on time. Late homework assignments will receive a 50% deduction. One minute past the due date and time is considered late. Technology issues are not an excuse for late submission and are subject to the late assignment deduction. Late homework assignments are accepted up to 7 days from the original due date and time. Late assignments will be accepted after these seven days but will receive a score of zero. All missing assignments will receive a score of zero. It is the student's responsibility to follow submission due dates and times.

7. All homework assignments, presentations, written assignments and projects must reflect the student's own work. Copying other students work or using AI tools (i.e., Chat GPT or other generative AI software) to complete an assignment is **prohibited.** AI tools may be used when explicitly stated by the instructor for specific assignments. Work found to be completed by copying or with unauthorized AI assistance will be considered a violation of academic integrity and may be subjected to disciplinary actions or the college's misconduct process.

V. Classroom Expectations:

1. **Hybrid Course Delivery Guidelines:** Since this is a hybrid course, part of the course content is delivered outside of the classroom and in your home. It is expected that you have a designated learning space in your home or other outside classroom accommodations. **This space should be free of distractions (i.e., pets, children, siblings, parents, significant others, music, and television). You will not be permitted**

to attend to these distractors during class or during at test. In this space, you will have adequate lighting, an area to sit upright, all electronic devices needed, textbooks, and note assignments.

2. **Zoom Lectures:** During online class lectures, the student will:
   - Be appropriately dressed, sitting upright (preferably at a table or desk), with the camera on unless otherwise instructed
   - Take care of personal needs (restroom) prior to the beginning of the class
   - Remove all distractors from the Zoom area
   - Mute your mic, unless answering or asking questions
   - Use the raise hand feature to ask questions or get the instructors attention
   - Complete the required weekly content prior to class (i.e., reading assignments, homework assignments)
   - Be prepared to participate in class (ask and answer questions)
   - Have the required material on hand at the time of class (i.e., note packets, textbooks, etc.)
   - Review the day's material or complete other assignments as the student waits for others to finish a test or in class assignment
   - Stay on task when given in class activities and group assignments

3. Demonstrate professional oral and written communication (emails, class discussion, group activities)

4. Unless otherwise instructed, cell phone use is not permitted in hybrid courses or in person labs. If a student has their cellphone out distracting others or the instructor, the student will pay a donation of $1.00 to the Robert L. Garber scholarship fund. Examples (but not a complete list) of cell phone distractors are as follows:
   - Texting
   - Cell phone ringing or vibrating loudly
   - Answering and conversing over the phone
   - Watching videos
   - Playing music

5. Treat classmates and instructors with respect at all times

6. Use course resources wisely. Examples include:
   - ✓ Assigned reading material
   - ✓ Recorded lectures, notes, and power points
   - ✓ Practice quizzes
   - ✓ Rad Tech Boot Camp (RTBC)
   - ✓ Worksheets
   - ✓ Group activities
   - ✓ Class discussion
   - ✓ Lab material
   - ✓ Tutoring
   - ✓ Review of prior exams
   - ✓ Instructor office hours

VI. Intellectual Property Rights

1. All work and materials presented by instructors are protected intellectual property. Students may use these materials for personal study purposes only. Copying, sharing, or redistributing instructor content without written permission is not permitted. Doing so, constitutes a violation of intellectual property rights and my result in disciplinary actions.