



**Course Syllabus
SEMESTER
School of Nursing and Health Professions**

<i>What is it?</i>	<i>Here is the Answer!</i>
Course Name:	Intro to Radiologic Physics
Course & Section Number:	MIT 211- XXX
Meeting Day(s) & Time(s):	
Credits:	Total 2
Contact Hours:	1.5 lecture
Instructor's Name:*	
Student Hours (Formerly Office Hours) & Location:	
OCC Email:**	
Additional Contact Information:	

**Please only use your student OCC email to contact me.

Catalog Description:

MIT 211 - Intro to Radiologic Physics

Basic principles of radiobiology and radioprotection applicable to patient imaging are discussed. Exposure factors adjustments and the resultant effects on image quality are presented. Lab activities support lecture material.

Co-requisite: MTH 133 or MTH 213 or MTH 170 or MTH 175

Prerequisite: NONE

Credits: 2(Lec: 1.5 Lab: .5)

School: Schl of Nrs & Hlth Professions

Department: Radiography Dept

Attributes: General Elective

Course Materials:

1. RADIOLOGIC SCIENCE FOR TECHNOLOGISTS

BUSHONG, STEWART C.

ISBN13: 9780323661348

EDITION: 12TH

FORMAT: HARDCOVER

PUBLISHER: Mosby Inc

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2. Owens Community College, MIT 211 Laboratory Manual, Fall 2024 (provided online)
3. Windows Computer with Respondus Lockdown Browser Installed and Web-Cam Access for on-line testing

OER and Owens Community College Library Resources (Open Educational Resources are free online materials for instructor and student use. Some OER material may be available in print in the Owens Community College Library.)

What Will I Learn in This Course:

Course Objectives:

The course

1. Introduce students to the concepts of radiation protection and the importance of protecting patients and technologists in the energized radiographic room.
2. Provide opportunities for students to have hands on learning of the radiographic Control panel and manipulation of the x-ray tube to produce high quality radiographic images.
3. Presentation of information to students regarding the equipment necessary to produce x-rays and the properties of interactions essential to x-ray production.

Student Learning Outcomes:

Student will...

The student will:

1. Identify the properties associated with x-ray production.
2. Demonstrate an introductory knowledge of the x-ray control panel how it functions.
3. Distinguish the differences between computed radiography and digital imaging systems.
4. Explain the concepts of radiation protection including the ALARA concept.

5. Explain the factors of radiation protection including designing rooms and utilizing equipment for highest degree of radiation protection.

Outcome	Where Assessed (List assignments, exams, discussions; items must be graded.)
1. Identify the properties associated with x-ray production.	Quizzes, Worksheets, Introduction Discovery of X-rays Electromagnetic Energy, Electricity /Magnetism Motors and Generators ,X-Ray Tube X-ray Production X-ray Interactions with Matter , Lab Experiments
2. Demonstrate an introductory knowledge of the x-ray control panel how it functions	Lab #1
3. Distinguish the differences between computed radiography and digital imaging systems	CR Cassettes vs. Flat Panel Detectors /PACS Worksheet #5 &6
4. Explain the concepts of radiation protection including the ALARA concept.	Health Physics Patient/Occupational Dose ManagementWorksheet #4, Quiz #3
Explain the factors of radiation protection including designing rooms and utilizing equipment for highest degree of radiation protection.	Image Quality/Control of scatter radiation, Worksheet #3 Quiz #3

Program Outcomes:

The following program outcomes are assessed in this course

Goal 1: Students will be clinically competent.

Goal 2: Students will utilize critical thinking skills.

Goal 3: Students will be able to communicate effectively.

Institutional General Education Competencies:

As a student at Owens Community College, you will take General Education courses as part of your degree program. While specific to the General Education courses, will be reinforced in many of your degree program major courses and may be measured in your capstone course(s) and others as identified.

1. Communicate effectively.
2. Act with professional responsibility.
3. Demonstrate sensitivity to other's beliefs and values.
4. Think analytically, critically, and creatively.

Institution General Education Competency	Where Assessed
Communicate effectively.	Lab Reports
Act with professional responsibility.	Lab Reports, Due dates for assignments
Demonstrate sensitivity to others' beliefs and values.	
Think analytically, critically, and creatively.	Lab Reports, Worksheets, Quizzes, Tests, Final Exam

Technology, Lab, and File Requirements:

The Blackboard Learning System is an online course environment available for all Owens courses, even those that are not web-based. Blackboard offers students a resource where they can communicate and collaborate with instructors and fellow students outside of the physical classroom. The Radiologic Technologies Department integrates Blackboard into each course, and it is essential for all students to become familiar with the system. Check the STUDENT HELP AND RESOURCES tab on the blackboard shell for information on technical support and Software/Hardware requirements for utilizing Blackboard to complete assignments and communicate with peers and faculty.

Calculators: Please be sure that you have a calculator available as necessary for lecture class and testing sessions. Cell phones/iPads or laptops may be used for testing but may not be used as calculators. When testing, the Respondus calculator will be activated.

Specific download and installation Instructions are posted in Blackboard:

Academic Support

Disability Services Resource Center: If you have a disability or acquire one, you may be entitled to receive reasonable accommodations intended to assure you an equal opportunity to participate in and benefit from the program. To receive more information or to register for accommodations, please contact the Disability Resource Center at 567-661-7007, email disability@owens.edu, visit <https://www.owens.edu/disability/>, or stop by College Hall 124.

Tutoring Services: Owens Community College offers academic tutoring and assistance in a variety of subjects including: accounting, computing, economics, mathematics, science, and writing. For more information go to: <https://www.owens.edu/successcenters/>.

Counseling Services: Counseling Services provides assistance to students experiencing personal, educational, interpersonal/relationship, family, social, or psychological difficulties. If you feel you may benefit from this service, please contact

them at counselingservices@owens.edu. More information is at <https://www.owens.edu/counseling/>.

Campus and Community Connections: The Center for Campus and Community Connections (College Hall 123) is a walk-in office created to provide retention support through resource stability initiatives and community connections. Go here for more information: <https://www.owens.edu/connection/> or contact connections@owens.edu

Owens Library: The Owens Library offers two locations (Toledo and Findlay) as well as online resources. For more information visit <https://www.owens.edu/library/>.

Students can find more information on campus resources, student support, student life, and security at this [link](#).

General Information

Student Code of Conduct: All students are expected to follow Owens Community College's [Student Code of Conduct](#), which includes academic honesty, encompassing plagiarism. See the [Board Policy](#) for more information.

Anti-Discrimination and Harassment & Title IX/Sexual Misconduct: All students, faculty, and staff are expected to follow Owens Community College's [Anti-Discrimination and Harassment Policy](#) and the College's [Title IX Policy](#)/Sexual Misconduct Procedures and Guidelines. The College strictly prohibits and will not tolerate harassment, discrimination, intimidation, or hostile/offensive working or learning environments.

Religious Accommodations: A student seeking an accommodation for an absence permitted under Ohio's Testing Your Faith Act must provide the instructor with a written email notice with the specific dates for an absence, and must do so not later than fourteen (14) days after the first day of instruction. Alternative accommodations are not retroactive, and no academic penalty will be imposed for an absence under the policy*. The request for an alternative accommodation will be kept confidential. Students with questions about a religious accommodation under Ohio's Testing your Faith Act may contact the College's Office of Academic Affairs: provost@owens.edu
The policy may be found on the Owens website: [3358:11-2-63 Accommodation](#) for a Student Absence for the Observance of Religious Beliefs and Practices Policy

Document Collection: Throughout the semester, your instructors may ask for a variety of assignments including tests and/or quizzes for student learning of institutional general education competencies or program assessment. Please save all your class materials until the end of the semester.

Classroom Admittance: OCC classes shall only be attended by the officially registered OCC students or perspective students, instructor of record, guest lecturer, or substitute. Visitors are not permitted to be in the classroom and should not be invited to attend or participate in the class. See [FERPA](#) regulations for more information. For any changes, students must talk with their instructor first and then their advisor.

Face-to-Face Classes: students must attend this class in person only. Instructors will not allow a different form of instructional delivery.

Use of AI Tools: This course permits you to use artificial intelligence (AI) tools, such as chatbots, text generators, paraphrasers, summarizers, or solvers, to get guidance on assignments, as long as you do so in an ethical and responsible manner. Essentially, you can think of these tools as ways to help you learn but not to entirely create work for assignments like discussion board posts, essays, presentation slides, and so on. AI is more like your tutor or TA, not a replacement for your independent thinking.

This means that you must:

- Not use AI tools to replace your own thinking or analysis or to avoid engaging with the course content.
- Cite or explain any AI tools you use. Provide the name of the AI tool, the date of access, the URL of the interface, and the specific prompt or query you used to generate the output.
- Be transparent and honest about how you used the AI tool and how it contributed to your assignment. Explain what you learned from the AI tool, how you verified its accuracy and reliability, how you integrated its output with your own work, and how you acknowledged its limitations and biases.

You are accountable for any mistakes or errors made by the AI tool. Always check and edit the output before submitting your work. If you discover any inaccuracies or inconsistencies in the output after submission, notify the instructor immediately and correct them as soon as possible.

Using AI tools in an unethical or irresponsible manner, such as copying or paraphrasing the output without citation or transparency, using the output as your own work without verification or integration, or using the output to misrepresent your knowledge or skills, is considered a form of academic dishonesty and will result in a zero grade for the assignment and possible disciplinary action. If you have any questions about what constitutes ethical and responsible use of AI tools, please consult with the instructor **before** submitting your work.

NOTE: Some instructors will also list specific acceptable and unacceptable uses or include a statement like “All written assignments, projects, and exams must be completed independently.”

If you have any questions about what constitutes ethical and responsible use of AI tools, please consult with the instructor before submitting your work.

What Are Student & Instructor Responsibilities?

Instructor's Responsibilities:

Attendance/Class Time:

We will be respectful of your time and begin and end class on time. If class needs to be canceled for any reason, I will notify students as soon as possible by email announcement.

Grading Assignments:

Assignments that are submitted by the due date will be graded and returned/recorded in the Blackboard grade center within 7 days. Assignments that are submitted after the due date *may* take up to 10 days before I am able to grade it.

Answering Emails:

I will do my best to respond to your emails within 24 hours on weekdays and within 48 hours on weekends. Please use your Owens email account to contact me.

Announcements:

I will post any updates and/or reminders on the Blackboard Announcement page, as well as send it out to your Owens email account.

Student Hours:

These posted times (posted outside my office door, 133S) are designated for me to be available to meet with and assist you, outside of normal class time, with any concerns/questions you may have regarding this course or program.

Facilitating Successful Completion of the Course:

I welcome questions, concerns, and experiences relevant to the topic, course and/or professional field. We learn from each other. If appropriate, I encourage you to share and ask during class. If not, please see me during student hours or email me. If there is a need, I will reach out to the student or class to address that need. I will make referrals to other campus resources as needed. I am aware that life is happening, and this class is not the only thing you have going on.

Student Responsibilities:**Attendance/Participation:**

Class discussions, activities and participation are an integral component of learning and understanding the course material and therefore, attendance is part of your grade in this class. If you are going to be absent, please notify the appropriate instructor prior to missing the class, if possible. Please look at the assignment calendar to see what was missed (topic, assignments, etc.), review the power points and contact the instructor if you have any questions.

Class will begin on time, so please plan accordingly. We understand things happen. It will only become an issue if your lateness becomes habitual: 5 points *could* be deducted from your final grade.

Make Up Tests:

A make-up test consisting of fill in the blank questions and answers may be administered if a student misses a regularly scheduled examination. To receive maximum credit, the student should notify the instructor at least 30 minutes prior to the scheduled testing time. If no notification is received, the student will receive a five (5) percent reduction from the score of the make-up examination.

Inclement Weather:

In the case that the campus closes due to inclement weather, online lecture may take place at the discretion of the instructor. Communication from instructor will be sent out the day of.

Assignment submission:

Students are to be familiar with the assignment calendar and how to submit assignments (on the assignment instructions on the blackboard shell). If you are unable to submit an assignment by the end of the day on the due date (on assignment calendar), you are encouraged to still submit it. Although full credit *may not* be given if the assignment is late, you will be able to earn *at least* partial credit.

Check Email/Blackboard Shell:

Any announcements and updates will be sent to your email and/or posted on the Blackboard shell. Students are encouraged to check their email *at least* once daily and to log into their Blackboard shell several times a week to remind themselves of upcoming assignments, etc.

Tests/Quizzes:

All dates for assignments and tests are listed on the assignment calendar. All tests and quizzes will be administered on Blackboard and taken during the designated class time. Please bring your laptop/tablet with you on these days with Respondus software loaded. If you do not have a device, please let us know ahead of time and we will make other arrangements for you.

Phones:

We have found phones to be a distraction in class. Please silence your phone and keep it out of sight. However, there may be circumstances you may need your phone available for personal reasons. If this is necessary, please be discreet and leave the classroom.

Contacting the Instructor:

Email is the best way to reach me, outside of student hours. Please include your course number and section in the subject line.

Asking for Help/Clarification:

I expect questions and that is ok. **Unless I am told otherwise, we will assume that every student understands everything said in class, on the Blackboard shell and through emails.** Sometimes the best thing you can say is “I am not following this concept” or “I have no idea where to begin with this assignment.” All classes, and courses in this program, will build on and further develop the information we discuss. Please reach out as soon as you have questions or need clarification.

Instructor Discrepancies:

If at any time throughout the semester you have a problem with the course and/or instructor, contact the instructor. If the issue cannot be resolved after discussion with the instructor, see the Department Chair: NAME, LOCATION, TELEPHONE, EMAIL.

Respectful Class Communication:

Our classrooms are a safe space. Faculty and students show respect for each other in class and all communication. There is also a short power point on the Blackboard info tab regarding polite, professional email communication.

Social Media Use:

The use of YouTube, Facebook, Instagram, Twitter, Discord, SMARTkapp or any other internet share site to distribute any course, campus lab, or clinical photos, audio recordings, or video recordings is prohibited unless written permission is received from all people involved. Using these sites to display comments about faculty, peers, staff, and/or patients is in conflict with our Inclusion Statement. Such comments may result in disciplinary action. Written permission involves completion of "OWENS COMMUNITY COLLEGE CONSENT FORM".

How Will Your Grade Be Determined and What Are the Major Assignments for the Semester?

Weighted Grade Scheme:

Breakdown of Course Grades

The lecture section will be worth 65% of the total course grade and will be divided as follows:

Lecture Test #1	15%
Lecture Test#2	15%
Final Exam	20%
Quizzes	10%
Worksheets	<u>5%</u>
	65%

Grading Procedure: The grading scale for the course is

93 – 100%	A
85 – 92%	B
76 – 84%	C
60 – 75%	D
59% or below	F

The course is divided into two sections:

1. Lecture 65%
2. Laboratory 35%

Students must earn a passing grade of 76% in both the lecture and laboratory components of the course. If either of the percentages earned is less than 76%, the student will earn a grade of “D or F” for the course and be removed from the program.

Assessment	Percentage of grade	SLO it measures	Gen Ed Assessment
Ten Lab Experiment *projects requiring data analysis, problem-solving exercises * Rubrics that evaluate the depth of analysis, accuracy of synthesis, logical reasoning, and critical evaluation of information.	25%	SLO 1,2,3,4 & 5	SLO 2
Test #1	15%	SLO 1	SLO 2 & 3
Test #2	15%	SLO 3, 4	
Final Exam *questions requiring analysis and synthesis of information.	20%	SLO 5	

Lecture Class Assignments

All lecture assignments and testing will be submitted online in the **MIT 211-XXX** course shell.
All lab assignments and testing will be submitted online in the **MIT 211-XXX** course shell

Lecture Tests:

All digital testing will utilize Respondus Lockdown Browser. All off-campus testing will utilize Responds Lockdown Browser with Web Cam. If students are not logged into Respondus during assessments, no credit will be issued for the assessment. A repeat exam consisting of fill-in-the-blank questions on campus will be administered.

Two (2) tests will be given. Each will be worth 15% of the grade.

Lecture Quizzes:

The student is advised to attend class regularly and keep reading assignments and studies up to date to fully benefit from these quizzes. Make-up quizzes will not be administered.

Note card Quizzes:

In order to allow students to be better prepared for lecture, note card quizzes will be given. These quizzes will need to be completed before the beginning of a lecture session on the topic for the day. For these quizzes, students may utilize notes their notes they have prepared from the reading assignments posted in the lecture schedule to be used during the quiz. Students

may not share notes and students may not provide notes for other students. The lowest note card quiz grades will be dropped over the full 8-week course. No late submissions will be accepted.

There will be two (3) lecture quizzes and two (2) Note card quizzes worth 10% of the total grade. These will be given during lecture class time. The lowest (one) quiz grade will be dropped over the full 8-week course.

Worksheets:

A series of worksheets are provided in the lecture manual and posted on Blackboard. When completed they will serve as valuable study guides. Students will need to submit answers on blackboard by the beginning of the class day and time that a worksheet is due. Students are allowed multiple attempts with the highest grade being recorded. All attempts must be completed by the day and time of the final exam. **The first attempt on a worksheet must be completed by the due date stated on the syllabus or a grade of 0% will be entered.** First attempts Worksheet numbers and due dates are listed in the syllabus along with the appropriate reading assignments. **No worksheet grade will be accepted after the lecture final exam.**

Final Exams:

A comprehensive final exam will be given, which will count for 20% of the course grade This test will be over all information presented in all 8 weeks of lecture.

Last Updated DATE: This is just to give you a guide as to what we are going to cover in this course and when.

MIT 211 Lecture Schedule SEMESTER

Class days	SLO	Quiz	Topic TIME	Topic TIME	Assignments Due
1. (F)	1		Introduction Discovery of X-rays	Electromagnetic Energy	
Reading Assignments			Bushong Ch. 1 Ch. 3	Bushong – Ch. 4 Ch. 5	Worksheet #1 DUE
2. (F)	1	Quiz #1 In Class (20 min)	Electricity /Magnetism Motors and Generators	X-Ray Tube~	
Reading Assignments			Bushong -Ch.5	Bushong Ch.7	Worksheet #2 DUE Notecard Quiz #1 DUE
3. (F)	1,4	Quiz #2 In Class (20 min)	X-ray Production	X-ray Interactions with Matter	
Reading Assignments			Bushong-Ch.8	Bushong Ch.10	Worksheet #3 DUE
4. (F)	1		Exam ~ 1		
5. (F)	5		Image Quality	Control of scatter radiation	
Reading Assignments			Bushong – Ch.14 Ch. 21	Bushong – Ch.22	Worksheet #4 DUE
6. (F)	3,4	Quiz #3 In Class (20 min)	CR Cassettes vs. Flat Panel Detectors /PACS	Health Physics Patient/Occupational Dose Management	
Reading Assignments			Bushong Ch.12 & Ch.13	Bushong Ch. 35, Ch. 36 Ch 39 & Ch.40	Worksheet #5 DUE Worksheet #6 DUE NOTECARD QUIZ #2
7. (F)	5,3		Exam ~ #2		
8. (F)	3, 4, 5		FINAL EXAM		

LABORATORY SECTION

<i>What is it? Here is the Answer!</i>	
Course Name:	Introduction to Radiologic Physics
Course & Section Number:	MIT 211 - XXX
Meeting Day & Time:	
Credits:	2 Total
Contact Hours:	1.5 lab
Instructor's Name, Student Hours (Formerly Office Hours) & Location, OCC Phone, OCC Email Additional Contact Information:	

**Please only use your student OCC email to contact instructors.

What Are Student & Instructor Responsibilities?

Instructor Responsibilities:

We will be respectful of your time and begin and end lab on time. If lab needs to be canceled for any reason, We will notify students as soon as possible by email announcement.

Answering Emails:

We will do our best to respond to your emails within 24 hours on weekdays and within 48 hours on weekends. Please use your Owens email account to contact instructors.

Announcements:

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Student Hours:

These posted times (posted outside instructor office doors) are designated for us to be available to meet with and assist you, outside of normal class time, with any concerns/questions you may have regarding this course or program.

Facilitating Successful Completion of the Course:

We welcome questions, concerns, and experiences relevant to the topic, course and/or professional field. We learn from each other. If appropriate, We encourage you to share and ask during lab. If not, please see us during student hours or email us. If there is a need, We will reach out to the student or class to address that need. We will make referrals to other campus resources as needed. We are aware that life is happening, and this class is not the only thing you have going on.

Student Responsibilities:

Lab expectations:

The student must assume responsibility for preparing for labs. It is expected that the student will read and study the assigned material covering the unit in the text before the instructional lab session.

Students will be engaged in the lab session, focusing on lab activities ONLY. Students are expected to participate in lab lecture discussions and be prepared to answer questions at any time during the session.

Students working in the energized laboratory must wear their radiation badges at all times.

Attendance/Participation:

The MIT labs are extremely important. Students who are tardy to a scheduled lab, not prepared for class or leave early are disruptive to the class. Please refer to the Procedure Manual for the complete laboratory attendance policy.

Participation in lab activities is vital to the learning process and successful completion of this program. If you cannot participate in an activity, please tell the instructor as soon as possible. We may be able to modify.

Students are expected to leave the laboratory in an organized fashion, putting away sponges, positioning tools etc. in the cabinets.

Breakdown of Course Grades

The laboratory section will be worth 35% of the course grade, divided as follows:

Laboratory Quizzes	10%
Laboratory reports	20%
Laboratory Report #10	<u>5%</u>
	35%

Class Assignments

Quizzes

Quizzes worth 5% of the lab grade will be given at the beginning of each instructional session. Students must assume responsibility for preparing for labs. It is expected that students will read and study the assigned material covering the unit in the text before the instructional lab session. Student may utilize self-prepared notes for these quizzes. There will be no makeup quizzes, but the lowest quiz grade will be dropped.

Laboratory Experiments and Procedures

There are a total of 9 laboratory experiments to be completed. Students will perform various technical experiments putting radiological theory and its application into use. Students are expected to work with their group member(s). Duplication of the laboratory data is not permitted and the instructor reserves the right at his/her discretion to penalize students (with point value deductions) who is suspected of doing so.

Lab Reports

All lab reports must be turned in on the next schedule lab day. There will be a ten- point reduction from the report score for each week it is late. If students will be absent from the assigned lab, he/she must contact the instructor or leave a message at least 30 minutes prior to the laboratory session. Failure to comply will result in a 0 for the experiments missed. At the discretion of the instructor for 2 labs only, students will either make-up a missed lab or provide a 3-4 page typed paper covering the missed lab material and will be due one (1) week from the date of the missed lab. Any lab experiment turned in 4 weeks past the due date will not be accepted. Lab Report #10 Design A Room Assignment Due by DATE at TIME. All other lab reports must be turned in by DATE at TIME. No report will be accepted after this date.

***LAB LOCATIONS MAY VARY**

MIT 211 Lab Schedule SEMESTER

Week	SLO	Experiment	Reading from Bushong (v 11)
1	1,2	Introduction Use of Control Panel/Tube Manipulation	Ch 1 and 2
2	1	Batteries, Resistors, in Series and Parallel Circuits Notecard quiz	Ch 1, 2, 3 and 4
3	1	X-ray Generators: Electromagnets and Transformers Notecard quiz	Ch 4 and 5
4	1,4	Management of Control Factors/Inverse Square Law Notecard quiz	Ch 3 and 6
5	1, 4	X-ray Interactions with Matter Notecard quiz *Design A Room Assignment Issued	Ch 8, 9 *Read Design a Room PowerPoint
6	1,4	Effects of Tube Current on Exposure and Density/Anode Heel Effect Notecard quiz	Ch 7, 8, pp. 115-116

7	3	Importance of Beam Restriction Notecard quiz	Ch 11, 15 and 16: DR/CR only.
8	3	Radiation Protection Notecard quiz *Design A Room Assignment Due by 3pm on 10/10	Ch 35, 36, 37, 39 and 40

Disclaimer: "The instructor reserves the right to amend this syllabus as deemed necessary and will communicate such amendment to the students in the course.