

San José State University
College of Science – Nuclear Science
Chem 121S, NucS 121S, Phys 121S; 1 unit

Instructor(s):	Victor Maraschin
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Office Hours:	Fridays, 9 – 10 AM or by appointment: Zoom appoints also available.
Class Days/Time:	Fridays, 11 – 11:50 AM
Classroom:	Duncan Hall 181
Prerequisites:	Lower division Chem, Physics, and Calculus or instructor's consent

Course Description

Health hazards involved in working with radioactive substances. Physical nature of hazards, biological effects, standards of permissible exposures, safety precautions and protection techniques. Two units meet State of California recommendations. Prerequisite: Lower division calculus, chemistry and physics.

Course Format

This class is in-person, but in any event mandated by the SJSU President, the class will/can migrate to online modality.

Course Learning Outcomes

Building awareness of what materials around us are radioactive and how to handle lab situations that involve radioactive materials, and demonstrations of detection methods of materials.

Upon successful completion of this course, students will be able to:

1. Understand basic radiation safety practices.
2. The differences between different types of ionizing radiation and effects on the body.

Text/Readings

None: Handout will be supplied by the instructor.

Other Readings

(No need to purchase books)

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Introduction to Health Physics, 3rd Ed., by Herman Cember., McGraw-Hill, 1996.

Principles of Radiological Health and Safety by Martin, James E. & Lee, Chul., John Wiley and Sons, Inc. Hoboken NJ 2003

Course Requirements and Assignments

Graded work will include a total of a class participation, midterm, lab reports and a final exam. Midterm answer sheets will be provided the actual exam will be kept by the instructor; review of your exam can be done by appointment only.

Labs procedures will be handed out in class and discussed briefly.

Lab write-ups format will follow the handout on Memoranda Reports. ALL LAB ASSIGNMENTS ARE DUE THE AT THE BEGINNING OF LECTURE THE FOLLOWING WEEK OR AS INDICATED ON THE SCHEDULE BELOW.

Assignments	Points
Presentations	50
Midterm	25
Labs (3)	75 total
Final	50
Class Participation	25
Total	225

Final Examination or Evaluation

The final will be comprehensive including labs will be on December 2, 2022, from 9:45 AM – 12 noon.

Grading Information

Points will be distributed as described in Course Requirements and Assignments above. I reserve the right to scale exam grades. If scaled, each exam will be given a raw score and a scaled score. The raw score will reflect your performance on that material as compared with your classmates. The scaled score will be used to calculate your final grade. Scores will never be scaled down from your raw score. I reserve the right to adjust this in either direction if, in my estimation, the class overall performed differently than a “typical” class. The course grade will be determined from the resulting average of the point total as follows:

Percent of total points	Final course grade
96 +	A+
92 – 95.9	A
88 – 91.9	A-
84 – 87.9	B+
80 – 83.9	B

[Type here]

76 – 79.9	B-
72 – 75.9	C+
68 – 71.9	C
64 – 67.9	C-
60 – 63.9	D+
56 – 59.9	D
52 – 55.9	D-
<52	

University Policies

Per [University Policy S16-9](#), relevant university policy concerning all courses, such as student responsibilities, academic integrity, accommodations, dropping and adding, consent for recording of class, etc. and available student services (e.g. learning assistance, counseling, and other resources) are listed on [Syllabus Information web page](#) (<https://www.sjsu.edu/curriculum/courses/syllabus-info.php>). Make sure to visit this page to review and be aware of these university policies and resources.

Classroom Protocol

Attendance is mandatory on lab and oral presentation days. The labs and presentations will start on time and no one will be admitted into the facility for labs after 11AM. This is due to the nature of the materials involved and for the facility security.

Please review the University policies in the previous paragraph.

Missed Exams and Group Activities

If an exam or quiz is missed without a legitimate excuse a scaled score of “0” will be entered for that exam. In no case will a make-up exam or in-class activity be given. Contact me in advance if you will miss a group activity or exam date for a legitimate activity.

Chem 121S, NucS 121S, Phys 121S Fall 2022 Schedule of Class Events

Tentative Schedule – I reserve the right to change the schedule to fit the needs of SJSU.

Course Schedule

Week	Date	Topics, Readings, Assignments, Deadlines	Learning Outcomes
1	1/27	Introduction, lecture on decay trends, energy, types of emission, terms.	
2	2/3	Lecture; terms continued, history, radiation effects on the body	

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Week	Date	Topics, Readings, Assignments, Deadlines	Learning Outcomes
3	2/10	Lecture; radiation effects on the body, dose values	
4	2/17	Detectors lecture: Their Efficiencies, Math review, types of sources and detectors; Oral presentations topics	
5	2/24	Lab#1 In DH-185 learning to use a GM to find contamination	Lab#1-- GM contamination detection
6	3/3	Lecture; stochastic vs non-stochastic, risk assessment	(lab #1 write up due)
7	3/10	Lab #2 In DH-183; Detector Efficiencies	Lab #2 --GM efficiencies with calibrated
8	3/17	Mid term	(lab #2 write up due)
9	3/24	Lecture; background radiation, NRC/State Regulations	
10	3/31	Spring Break	
11	4/7	Lab #3 in DH-183	Lab #3 -- Half-life determination & unknown thickness
12	4/14	Oral Presentations	(lab #3 write up due)
13	4/21	Oral Presentations	
14	4/28	Oral Presentations	
15	5/5	Oral Presentations or Special Topics	
16	5/12	Lecture; Time, Distance, Shielding, ALARA Principles.	
17			
18			
19			
20			
Final Exam	5/22	DH-181 9:45AM – 12 Noon (grades will be available on 5/25)	

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