

**PHYSICS 421 – *Foundations of Health Physics***

**INSTRUCTOR:** Dr. Ram Yadav  
**Department:** Biological and Physical Sciences  
**College:** Science, Technology, Engineering, Mathematics & Transportation  
**Course:** P 421 Foundations of Health Physics  
**Office:** Davis Hall, Room 323  
**Office Hours:** 12:00 pm – 1:00 pm (MTWR), 3:00 pm – 4:00 pm (TW), or by appointment  
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**CLASS MEETING TIMES & LOCATION:**

MTWR 1:00 pm - 3:00 pm                      Hodge Hall Room 218

**TEXTBOOK:** Fundamentals of Health Physics & Radiation Protection, Philip C. Fulmer, 2024;  
**This will be provided by the instructor on loan and then returned at the end of the semester.**

**I. CATALOG COURSE DESCRIPTION:**

This is a course for science and engineering majors that is designed to teach students basic principles in Health Physics. The student will acquire the background necessary for effective participation in operational radiation protection.

**II. COURSE RATIONAL AND OBJECTIVES**

This course, through its content and activities, prepares the student to have a foundation in the health physics. The course will provide the student with a working knowledge of:

- radioisotopes and their technical uses with emphasis on radiation safety
- the use of nuclear instrumentation and tracer problems

**III. COURSE COMPETENCIES**

See “Expected Measurable Student Learning Outcomes”

**IV. EXPECTED MEASURABLE STUDENT LEARNING OUTCOMES**

It is expected that the student will be able to achieve all of the objectives listed under *Course Rational and Objectives*. Demonstration of the level of competency will include successful completion of in-class activities, homework assignments, writing assignments and testing by exam. Specific measurable outcomes will include the basic fundamental technical knowledge of:

- health physics (health, environmental, nuclear)
- radiation safety
- the Nuclear Regulatory Commission (NRC) guidelines and regulations
- hazardous waste handling
- advanced instrumentation
- written and verbal communication skills on health physics issues

- practical experience in problem solving and emergencies in the radiological and nuclear disciplines
- ability to work independently or in a group

## V. OUTLINE OF COURSE CONTENT

The chapters from the text that will be covered are listed below. In some instances only a portion of a given chapter will be covered.

1. SUMMARY OF BIOLOGICAL EFFECTS OF RADIATION (Chapter 2)
2. RADIATION EXPOSURES TO PEOPLE (Chapter 3)
3. DOSIMETRY OF MEASUREMENTS FOR EXTERNAL SOURCES OF RADIATION (Chapter 5)
4. ENVIRONMENTAL HEALTH PHYSICS FATE AND TRANSPORT MODELING (Chapter 11)
5. ENVIRONMENTAL HEALTH PHYSICS MONITORING (Chapter 12)
6. NUCLEAR REGULATORY COMMISSION ([www.nrc.gov](http://www.nrc.gov))

## VI. SPECIAL COURSE REQUIREMENTS:

All students are **required to attend the class daily (excluding medical emergency, or other urgent situation)**.

**Email contact:** The student is expected to have an email account and to monitor that account daily to check for messages from the instructor. This mode of communication will also be used to exchange information.

**Blackboard Account:** The student is expected to monitor daily the class Blackboard account for announcements and posting of course material and grades. Some assignments will be uploaded to the account.

**Professional Promptness and Deadlines:** The student is being prepared for employment and/or graduate school. Therefore, promptness and meeting deadlines will be emphasized. The student will notify the instructor via text messaging or email of any late arrival or cancellation of class meetings. Tardiness, missed meetings and missed assignment deadlines will have a negative impact on the student's assessment and grades.

**VII. METHOD OF EVALUATION:** The student's total score for this course will be determined according to the following weighting:

|                                  |     |
|----------------------------------|-----|
| Homework (Question/Problem Sets) | 35% |
| Quizzes                          | 20% |
| Chapter Exams                    | 25% |
| Final Exams                      | 20% |
| <b>Total 100%</b>                |     |

**Question/Problem Sets:** Short or long-answer questions are assigned from each chapter. These will include problem-solving homework sets assigned on a weekly or bi-weekly basis depending on the length of each assignment.

**Grading Scale:** Based on the total points earned as a percent of the total possible points to earn for the semester, the following letter grades will be assigned:

|           |   |
|-----------|---|
| 90-100%   | A |
| 80-89%    | B |
| 70-79%    | C |
| 60-69%    | D |
| Below 60% | F |

### VIII. BIBLIOGRAPHY

The textbook and reference textbook will serve as the primary source of information for this course. Additional journal articles will be provided by the instructor.

### IX. COURSE POLICIES

#### **Excused Absences:**

If you miss a class period or activity time, contact the instructor as soon as you return to class to find out if your absence is excused. You must provide acceptable documentation in order for the absence to be considered excused. Absences which may qualify as excused include official school activities, medical emergencies, a death in the immediate family, and court appearances. Other reasons may also qualify as an excused absence at the sole discretion of the instructor. You will need to provide documentation to receive an excused absence. An excused absence will allow you to makeup any missed work for full credit without penalty.

#### **Unexcused Absences:**

If you miss a class for any reason not qualifying for an excused absence, you should contact the instructor as soon as possible. Unexcused absences may result in a grade of zero for that lab.

#### **Academic Dishonesty:**

No cheating or attempts to cheat will be tolerated. If anyone is caught cheating or attempting to cheat, the penalty is an immediate ZERO on the work involved. This grade of zero will not be dropped or substituted.

#### **Students with Disabilities:**

Students with disabilities (sensory, mobility, learning, medical, or any other form) should contact the Office of Disabled Student Services to discuss appropriate and reasonable accommodations and provide the instructor with any documentation generated by this office. Meet with the instructor in a confidential environment to discuss accommodations. **The instructor for this course is committed to providing equal access to education for all students.**

**Additional Assistance:** *I, the instructor, want you to succeed in this course* and to develop an understanding of the material. Developing deductive and problem-solving skills on your own is important. However, if you are unable to make progress on work, then seek out other members of the class and the instructor. Do not wait until the last minute to ask for assistance. If you are having difficulties in the course, contact me immediately. This is to include any issues that are not related to the content of the course that are impacting your ability to be successful. I will be glad to help with your effort to succeed in this course, but you, the student, must take the initiative to contact me and follow through with the necessary work.

In addition to talking to the instructor, if a student feels overwhelmed by academic, personal and/or professional concerns, please visit the **Counseling and Self-Development Center**.

**Note that this course syllabus is a general plan for the course.** However, circumstances may necessitate changes to what is contained herein. If any such changes are required, they will be posted to Blackboard. It is the responsibility of the student to monitor the course postings to Blackboard daily.