PHYS 7501 – Particles & Nuclei I **Fall 2021 Syllabus**

Course webpage: http://inpp.ohio.edu/~meisel/PHYS7501/phys7501_home.html
Instructor: Assoc. Prof. Zach Meisel *Office*: 204 Edwards Accelerator Laboratory
Email: meisel@ohio.edu *Office hours*: By appointment
Class location: Ellis 110 *Class times*: 1:30-2:50pm, Tuesday & Thursday
Optional text: "Modern Nuclear Chemistry" by Loveland, Morrissey, & Seaborg

Overview:
The purpose of this course is to provide an overview of key topics in nuclear physics, primarily focusing on nuclear structure and nuclear reactions. Special topics such as nuclear astrophysics, nuclear applications, and experimental methods will also be touched on. No prior knowledge of nuclear physics will be assumed and course content should be accessible to any graduate student in the Physics & Astronomy Department in their 2nd year or beyond.

The course will consist of lectures twice a week, intermixed with in-class group assignments. Additional learning tools will include homework assignments roughly every other week and two oral exams (a midterm and a final).

A preliminary schedule appears at the end of this syllabus. I will attempt to keep the online course schedule updated: https://inpp.ohio.edu/~meisel/PHYS7501/Schedule.html.

Grading:
This class will follow the philosophy of "ungrading", meaning assignments will not be given a grade. I will qualitatively assess your assignments and your progress in the course. Of course, I still need to assign a final grade. This is determined based on these guidelines. We will individually check in at regular intervals to discuss how the course is going. Effort will be emphasized over achievement. I want you to enjoy what you're learning and work hard because you're enjoying it.

Comments on Homework & Group Work:
Students are encouraged to work together on homework assignments outside of class and are required to work together on group assignments during class. However, you must submit your own written and/or programmed solutions to each problem. Copying will not be tolerated and will result in a zero on the assignment and possibly in the course. Doing the work yourself is how you will learn. If you didn't do it, you didn't learn it. In that case, why take the class?

Exceptions for homework deadlines must be pre-arranged. Any in-class group work that is missed must be completed as if it were a homework assignment. Technically, only official

university excuses will be accepted for absences, but other exceptions can be made with sufficient advance notice or for special circumstances. Please ask.

Exams:
There will be a midterm exam and a final exam. These will be oral exams, approximately 15-30 minutes in length. The final exam will not be cumulative, strictly speaking; however, it may necessarily draw on information from earlier in the semester which provides the foundation for later course content.

Attendance:
Come to class! If you have a good reason not to be there (e.g. personal issue, unique opportunity [like an academic conference]), please let me know. f you do not show up and do not provide an adequate reason, your grade will suffer. Any in-class group assignments which are missed will have to be made-up as a homework assignment.

Academic Honesty:
I trust you will act in an academically honest fashion. If you have any questions about what does or does not constitute academic misconduct, please let me know.

Academic Misconduct is a Code A violation of the Ohio University Code of Student Conduct. If you are found to be involved in academic misconduct regarding this course, you will receive a zero on the pertinent work and possibly for the entire course and/or referral to the Office of Community Standards and Student Responsibility. University Judiciaries may impose additional sanctions.

Inclusion and Expected Conduct:
Everyone is expected to behave professionally and respectfully. We will maintain a professional environment that encourages the free expression and exchange of scientific ideas and is characterized by an atmosphere of tolerance, equity, and mutual respect, regardless of personal attributes. We will keep in mind that behaviors and language acceptable to one person may not be acceptable to another and will ensure that our words and actions communicate respect for others. We will avoid offending others by exercising restraint and will maintain awareness that statements or actions not intended to be offensive to another person may be perceived as such. We will commit to being open minded and growing in our understanding of what it means to be inclusive. Harassment or bullying of any kind will not be tolerated.

If something has happened that is preventing you from learning in our environment, please either let me know so I can help find the best resources to support you on campus or in our community, or, if you are uncomfortable speaking with me, utilize the resources on campus like Counseling and Psychological Services, the Division of Diversity and Inclusion, and Equity and Civil Rights

Compliance. Please also see the list of resources (both internal and external to the university) maintained by the Department of Physics & Astronomy.

Resources for Victims of Sexual Assault and Misconduct:
I am committed to supporting you by creating an educational environment free from discrimination, sexual harassment, sexual assault, domestic and dating violence, and stalking. If you or someone you know has any of these experiences, know that you are not alone. Ohio University has policies in place to protect students, faculty, and staff and provides resources and support for those impacted. I encourage you to reach out for help. If you would like to report what happened, the Survivor Advocacy Program is a confidential resource that can help you determine what next steps, if any, you would like to take. Reports, which can be submitted anonymously, can be directly made at this website. I am also here to support you, but note that as a faculty member I am a "mandatory reporter". This means that I must report any instances of sexual harassment, sexual violence, and other forms of prohibited discrimination to the Office of University Equity and Civil Rights Compliance (ECRC).

Planned Schedule: *(Subject to change. Advance notice will be given as early as possible.)*

*Chapters refer to sections of the recommended textbook for the course, "Modern Nuclear Chemistry" by Loveland, Morrissey, & Seaborg. Supplemental/alternative readings are available on the course web page. Some topic discussions will be based far more on the supplemental/alternative readings than the recommended text.

Date	*Chapter**	*Topic*	*Due*
8/24	1,2	Nuclear Properties	
8/26	1,2,5	Nuclear Phenomenology	
8/31	6	Nuclear Structure	
9/2	6	Nuclear Structure	HW 1
9/7	6	Nuclear Structure	
9/9	3	Radioactive Decay	
9/14	7	α Decay	HW2
9/16	8	β Decay	
9/21	9	γ Decay	
9/23	11	Fission	HW 3
9/28	5,6	Nucleon-nucleon potential	
9/30		Scientific Presentations	
10/4-8 (**Arranged**)	**Midterm Exam**		
10/5	Midterm exams ongoing (by appointment), **No Class**		
10/7	Midterm exams ongoing (by appointment), **No Class**		
10/12	6	Nuclear Reactions	HW4
10/14	10	Scattering	
10/19	10	Direct Reactions	
10/21	10	Resonant Reactions	
10/26	10	Statistical Reactions	HW5
10/28	10	Other Reaction types	
11/2	10	Astrophysical Rates	
11/4	12	Astrophysical Rates	HW 6
11/9	12	Nucleosynthesis	
11/11	Veterans Day, **No Class**		
11/16	12	Nucleosynthesis	
11/18	4,13,14,16	Experimental Techniques	
11/23	4,13,14,16	Nuclear Applications	HW 7
11/25	Thanksgiving Break, **No Class**		
11/30		Special Topics	
12/2		Special Topics	
12/6-10 (**Arranged**)	**Final Exam**		