

Physics 7502 - Fall 2015 **Call #12416**

Instructor:	Dr. Julie Roche	Text:	Modern Particle Physics
Office:	206 Edwards Accelerator Lab		M. Thomson
Phone:	593-1982		ISBN 978-1-107-03426-6
e-mail:	rochej@ohio.edu	Meeting room:	CLIP 133
Meeting time:	Tu, Th 1:30-2:50 pm	Office Hour:	Wednesday 3-5pm and
	W 3:05-4:00 pm (occasionally)		by appointment

This syllabus, your homework and additional information about the course can be found on the Blackboard page associated to this class. The information presented in this document is subject to change, modifications to this syllabus will be announced in class. You are responsible with keeping up with the changes to the syllabus.

Learning outcomes

The intent of this class is to present an introduction to Particle Physics at the phenomenological level. Students taking this class are expected to have successfully completed the first year of graduate studies in the P&A department. At the end of this class, the successful student will be able to:

- Explain the basis of Feynman techniques used to calculate cross-sections for various processes as well as decay width and lifetime of particle resonances,
- Distinguish the three fundamental interactions felt by particles and connect them to results from modern particle physics experiment,
- Describe the theory of the Standard model of Particle Physics, and
- Analyze peer review research articles and assess their relevance.

1. Class schedule

The class schedule is given at the end of this document, it lists the topics that will be covered on a given day, the chapters of the book they relate to as well as due dates for homework sets.

2. Class web site

We will use Blackboard: <https://www.ohio.edu/oit/bbsupport/>

3. Assignments

Please keep in mind that for all those assignments, you are very welcome to stop by the office of your instructor before the due date with questions related to the homework or topics discussed in class.

3.1 Book reading

You should read the book ahead of time trying to identify: (a) the significant results presented in the reading material, (b) the significant steps used to explain these results, and (c) the least clear parts of the material. **Bring the book to class.**

3.2 Homework

Homework sets are due at the beginning of class on the days specified in the class schedule. Only about half of the problems assigned will be graded. The instructor will decide which problem to grade on the

due date. Please answer each problem on a different sheet. Homework not turned in by the due date will get a 5% late penalty per 24h lateness. Homework not turned in within a week of the due date will not be graded and will get a 0. If you have a university valid excuse for turning in an assignment late, please talk to the instructor as soon as possible.

3.3 Article study

At regular intervals, you are asked to prepare either a written summary or an oral presentation of an article that relates to a topic discussed in class. Your assignment (oral or written) will be defined on the first day of class.

Whichever assignment, the goal is to summarize the article. To do so you should identify (i) the outline of the paper and (ii) the main take-away of each section, finally you should explain (iii) why the article is worth publishing. Your presentation (written or oral) must summarize the article keeping the three following criteria in mind: (i) accuracy of content, (ii) comprehensiveness and balance and (iii) clarity of the delivery. The written summary should be 500 to 700 words. That is about 1.5 page single-spaced writing in Time New Roman font with font size 12. Show the number of words in your summary at the top of your assignment. The written summary can include plots and tables; these are not part of the length limit, so for clarity include them at the end of the write-up. The oral presentation should be 12 slides at max and last about 25 minutes. The oral presentation will be followed by an in-class discussion of the article. The quality of your participation to that discussion will account for 10% of your grade for that assignment. The grading scheme that will be used for this assignment is the last page of this syllabus.

Summaries not turned in by the due date will get a 50% late penalty. Summaries not turned in by the beginning of the final exam will not be graded and will get a 0. If you have a university valid excuse for turning in an assignment late, please talk to the instructor as soon as possible.

3.4 Cheating

Students suspected of cheating will be warned and may be asked to resubmit their work. Copying a full sentence from a source with or without citing is plagiarism. If you decide to use an idea entirely from a source, at a very minimum this idea should be entirely re-phrased and the source be cited. Students caught cheating may be given an F for the course. If the student does not agree with this action, the student may file a grievance through established University channels. The instructor may also initiate a review by the University Judicial Board. This action could result in suspension of the student or other punitive actions by the Judicial Board.

The value of a degree from Ohio University is largely determined by the strength of the reputation of all of us. Academic dishonesty cannot be tolerated and reflects on the reputation of all of us.

4. Grading policy

The individual numerical scores will be weighted as given above and added to give a total score out of 100. Letter grades will be awarded approximately as follows:

A- to A ≥ 90 ;	B- to B+ 80 to 89;
C- to C+ 70 to 79;	D- to D+ 60 to 69;
F < 60.	

The bands may be adjusted down but never up.

For this class, three criteria (with different weights) are used to evaluate the student performance:

Homeworks: 40%	Article studies: 30%	Exams: 30%
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5. Accessibility

Any student who suspects s/he may need an accommodation based on the impact of a disability should contact the class instructor privately to discuss the student's specific needs and provide written documentation from the Office of Student Accessibility Services. If the student is not yet registered as a student with a disability, s/he should also contact the Office of Student Accessibility Services.

6. Attendance policy

Although attendance will not be checked routinely, you are expected to attend classes regularly. Attendance is only required for the exams and for the in-class discussions of articles. Missing such required events without legitimate reasons will result in a zero for that assignment. The University defines legitimate excuses as including illness, death in the immediate family, religious observance, jury duty, and involvement in University-sponsored activities. Refer to the following link for more information about legitimate absences and ways to document them: http://www.catalogs.ohio.edu/content.php?catoid=39&navoid=2332#enro_info If you are returning to classes after a legitimate documented absence, you can expect your instructors' assistance (makeup work, excused absences, recalculation of the grade based on remaining work). If you are returning to classes after an "un-legitimate" or un-documented absence, contact the class instructor privately to discuss your case and determine if anything can be done to alleviate the consequences of your absence. The goal of the class instructor is to provide enough flexibility (within reasonable limits) to ensure you get the maximum out of the class.

Preliminary schedule for PHYS7502 Fall 2015

(Last update 08-20-15)

This schedule will change. Changes will be announced in class. It is your responsibility to keep up with the changes. Your instructor will gladly answer any of your questions regarding the schedule.

Date	Topic	Reading	Homework
Tu 08-25	Introduction	Chap 1-2	HW1 handed out
Th 08-27	Decay rates and cross sections	Chap 3	
Tu 09-01			HW1 due, HW2 handed out
Th 09-03	The Dirac equation	Chap 4	
Tu 09-08			
Th 09-10	Interaction by particle exchange	Chap 5	
Tu 09-15			HW2 due, HW3 handed out
Th 09-17	Class cancelled		
Tu 09-22	Electron-positron annihilation	Chap 6	
Th 09-24			
Tu 09-29	Electron-proton interactions	Chap 7	HW3 due, HW4 handed out
Th 10-1			
Tu 10-6	Deep inelastic scattering	Chap 8	
Th 10-8			
Tu 10-13	Symmetry and the quark model	Chap 9	HW4 due, HW5 handed out
Th 10-15	Midterm exam		
Tu 10-20	QCD	Chap 10	Article 1 handed out
Th 10-22			
Tu 10-27	The weak interaction	Chap 11	HW5 due, HW6 handed out
Th 10-29			
Tu 11-03	The weak interaction of leptons	Chap 12	Summary 1 due, Article 2 handed out
W 11-04	Paper presentation		
Th 11-05			
Tu 11-10	Class cancelled (either Tu 11-10 or Th 11-12)		
Th 11-12	Neutrino and neutrino oscillations	Chap 13	HW6 due, HW7 handed out
Tu 11-17	CP violations	Chap 14	Summary 2 due, Article 3 handed out
W 11-18	Paper presentation		
Th 11-19	Electroweak interactions	Chap 15	
Tu 11-24			
Th 11-26	Thanks Giving break (no class)		
Tu 12-01	Tests of the Standard Model	Chap 16	Summary 3 due
W 12-02	Paper presentation		
Th 12-03	The Higgs model	Chap 17	HW 7 due
Tu 12-8	Exam (starting at 12:20 pm)		

Your Name:

Title of the article summarized:

Grading sheet for article presentation, PHYS 7502

Possible points= 3: Good, 2: Minor mistakes, 1: Major mistakes, 0: Inexistent.

	Points
1. Accuracy of content	
1.1 All sections of the article are correctly identified.	
1.2 The main take-aways of the article are correctly identified.	
1.3 The summary is free of misunderstandings of the physics presented in the paper.	
1.4 The rationale for publishing the paper is convincing.	
2. Comprehensiveness and balance	
2.1 The summary respects the format requirement (length, text size, figure and plot placement).	
2.2 The sections of the summary are proportionally developed (reflecting the article).	
3. Clarity and readability	
3.1 Sentences are clear and free of vagueness or ambiguity. Sentences are your own no pasted from the article.	
3.2 The summary is free of grammatical and spelling errors.	
3.3 The summary includes appropriate transition between ideas.	
4. Participation to in-class discussion	

Final Grade (max=30 pts)	
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