Physics 33151

Matter & Interactions I

Instructor: Professor Curtis Meyer

Online Course Presence:

CMU Canvas

http//www-meg.phys.cmu.edu/physics_33151/

Check these regularly as all assignments and announcements will be posted here. We will not distribute paper copies in class.

Lectures: **Wean Hall 7316**

Monday, Wednesday & Friday 9:30-10:20

Recitations: **DHA325**

Tuesday & Thursday Sec A: 8:30-9 :20

Sec B: 9:30-10:20

Sec C: 10:30-11:20

Professor Curtis Meyer

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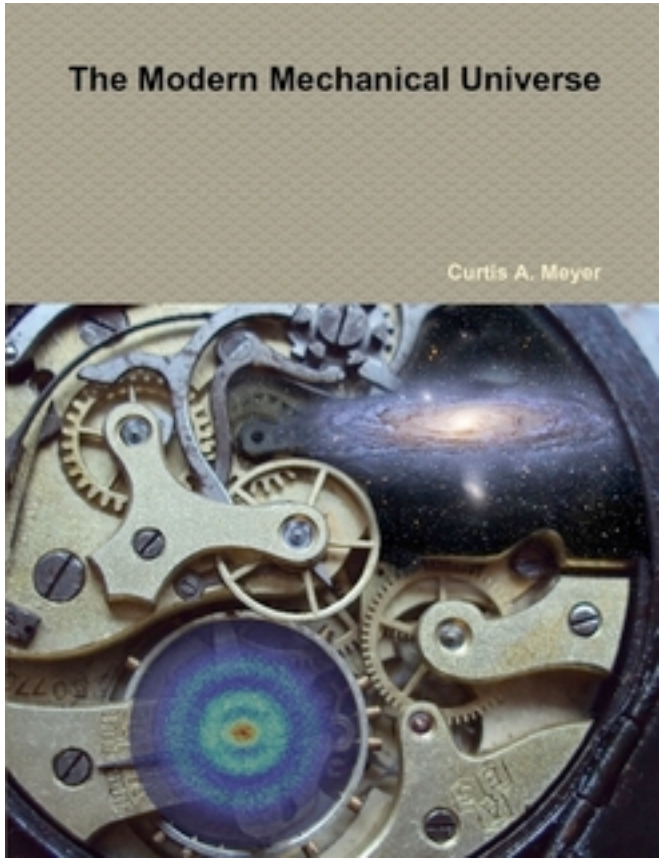
Experimental Medium Energy Particle Physics

My research is carried out at the Thomas Jefferson National Accelerator Laboratory (Newport News, VA)

"Why are quarks forever trapped inside protons and neutrons?" (The GlueX experiment)

Textbook *The Modern Mechanical Universe*



This book has been written for Matter and Interactions.

You will need to purchase it from the on-demand publisher, lulu.com.

Chapter 1 & 2 are available from the course Canvas site.

Textbook

The Modern Mechanical Universe

1. Forces and Interactions
2. The Fundamental Forces
3. Forces in Nature
4. Energy
5. Systems of Objects
6. Energy Quantization
7. Angular Momentum
8. Scattering and Collisions
9. Statistical Mechanics

Schedule of Activities

- All assignments are listed on Canvas.
- Solutions to all materials will be posted on Canvas.
- Announcements will be posted on Canvas.
- Grades will be kept on Canvas - double check what is entered.

- The course web site lists a day-by-day listing of activities.
- Where we are in the textbook.
- What is due every week.

Course Web Site

http://www-meg.phys.cmu.edu/physics_33151/

A detailed archive of all course information:

Weekly Activity Summaries for Physics 33.151

Week 1:	Aug. 26 to 30	First week of classes
Week 2:	Sep. 2 to 6	Monday is Labor Day holiday
Week 3:	Sep. 9 to 13	
Week 4:	Sep. 16 to 20	
Week 5:	Sep. 23 to 27	Exam 1 on Friday
Week 6:	Sep. 30 to Oct. 4	
Week 7:	Oct. 7 to 11	
Week 8:	Oct. 14 to 18	Mid-semester break, no class on Friday
Week 9:	Oct. 21 to 25	Exam 2 on Wednesday, no class on Friday
Week 10:	Oct.28 to Nov. 1	
Week 11:	Nov. 4 to 8	
Week 12:	Nov. 11 to 15	
Week 13:	Nov. 18 to 22	Exam 3 on Friday
Week 14:	Nov. 26 to 30	Thanksgiving Week, no classes Wed., Thur. & Fri.
Week 15:	Dec. 02 to 06	Poster Session on Thursday. Last week fo classes.

Course Web Site

http://www-meg.phys.cmu.edu/physics_33151/

Week 1 Log for Physics 33.151

Monday:
Course introduction, overview and logistics.
[**Syllabus**] [**Introductory Handout**] [**1st Lecture Notes (pdf)**]
MMU Sections 1.1, 1.2, 1.3.
Tuesday:
Vector review, [White board problems]
Wednesday:
MMU Sections 1.4, 1.5, 1.6.
Thursday:
Introduction to VPython, Computer Modeling [**Worksheet (pdf)**]
Friday:
Quiz on MMU Chapter 1.
MMU Sections 1.6, 1.7, 1.8.
Homework #1 is DUE at the start of class:
MMU Problems: 1.C38, 1.C39, 1.C.40, 1.C41

Exams

Exam 1	Friday September 27	9:30-10:20am
Exam 2	Wednesday October 23	9:30-10:20am
Exam 3	Friday November 22	9:30-10:20am

If you have a University sponsored conflict, let me know no later than 2 weeks before the exam

The final will be a three hour exam and will be scheduled by the Registrar – watch the Tartan for details.

Project

This course has a ``research project'' component.

With a partner, carry out a research project related to the material in the course. The project includes theory, scientific computing and possibly experiment. You will present a poster at the end of the semester and write a short report.

The project is worth 12.5% of your grade, but it is folded in with your exams to allow one score to be dropped.

E1	E2	E3	F/2	F/2	P	
12.5%	12.5%	12.5%	12.5%	12.5%	12.5%	Lowest is dropped!

Course Grade

Three "hour" Exams @ 12.5% Each	37.5%
Comprehensive Final Exam	25%
Project	12.5%
Assignments and Programs	20%
Quizzes	10%
Attendance	7.5%

62.5%

Grading will be on an absolute scale:

89%	to 100%	A
76%	to 88%	B
60%	to 74%	C
47.5%	to 59%	D

This can be lowered, but not raised.

Homework

You are encouraged to work together on your homework, and to ask lots of questions. Scientists solve problems by working in groups and we want to make sure that this happens.

Anything that you turn in needs to be your own work. we will not accept copies of other's papers.

There will be homework due every week during class on Friday. Late assignments will not be accepted without prior approval of an instructor.

See the course website for this week's assignment.

Quizzes

There will be a short (10 minute) quiz held during the Friday lecture nearly every week. The exact schedule is posted on the course web site.

These will be based on either the homework that you just turned in, or the exercises that you worked on in recitation during the week. Coming to class and doing your homework should be sufficient study for these.

The purpose of the quizzes is to give you continual feedback on your mastery of the subject.

Coming to Class

Participation in the in-class activities is an important part of the learning process. As such, I will base roughly 7.5% of your grade on attendance in both lecture and recitation.

This component of your grade will be most important if your grade is on the boundary between two grades.

Course Center

The recitation room, Doherty Hall A325, will be open in the evening Monday through Thursday each week. The exact hours are still being worked out.There will be instructors there to answer questions, and the computers will be available.

I strongly encourage you to take advantage of this to get together and work on physics with other students.

Course Goals

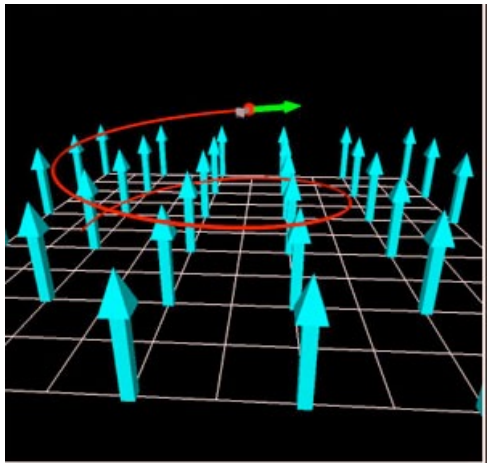
Model a broad range of physical phenomena using a small set of powerful fundamental principles.

Explain the nature of matter and its interactions in terms of a small set of physical laws that govern all mechanical interactions and in terms of the atomic structure of matter.

Learn to make reasonable assumptions and approximations to be able to solve complicated problems, then understand if the answer you have is reasonable or not.

Physical Modeling

An important part of M&I is modeling of real world situations using computer simulation. This is done using vpython inside a Jupyter notebook.



Links are on Canvas

You can download and install this On your own computer. It is also Installed on the clusters.

This is **not** a programming class, and no prior programming experience is required.

Lectures

Lectures will present new material, have demonstrations of physical concepts and involve concept questions to help you gauge if you are understanding the material.

I want the lectures to be as interactive as possible, so please do not hesitate to ask questions or make comments.

Recitations

Recitations meet on Tuesday and Thursday and will involve two types of activities:

Modeling of physical systems using computers.
Working out physics problems in groups.

The recitations are designed to reinforce and solidify the material that is presented in lectures. Many students find that this is where they really master the material.

Feeling Overwhelmed?

The course center is a good place to start for help.
Regularly attending these will make a difference.
Schedule a meeting with the Professor:
https://calendly.com/curtisameyer/30min
(Please wait 5 minutes as I may be running late)

If you find that this course is just too much, and that you don't have the time needed to keep up, it is possible to transfer into the 33-121 Physics for Science Students course. **The last possible date is 3 weeks into the course.**
33-121 uses a different textbook, but the overlap is pretty close.