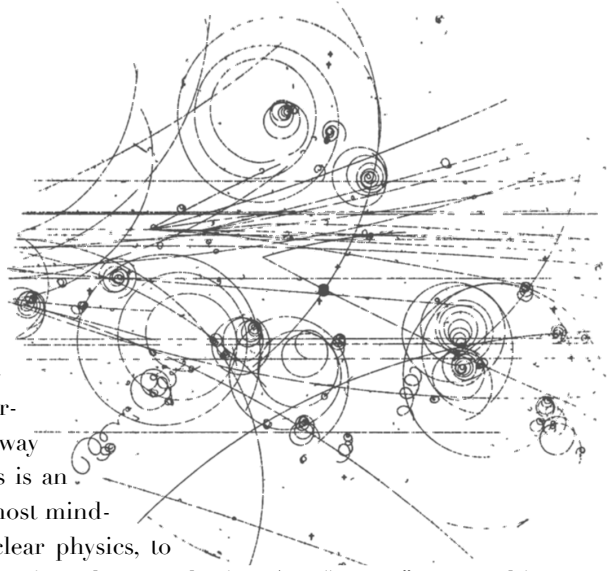


Professor: Dr. B. Sugerman
 Class: MWF 10:30-11:20 PM
 Website: *Modern Physics* on Blackboard
 Office Hrs: HS G19, M/Tu 11:30-12:30, Th/F 12:30-1:30 and by
 appointment
 E-mail: ben.sugerman@goucher.edu or
 send SMS to dr.sugerman@gmail.com
 Phone: 410.337.6555



Welcome to *Modern Physics*. This is a survey course of the discoveries made in physics during the early 20th century, a live-action replay (if you will) of the scientific drama that unfolded during the last 100+ years after the industrial revolution paved the way for a scientific one. Sometimes called non-classical physics, this is an exploration of the world on its smallest, largest, and sometimes most mind-bending scales: relativity, quantum mechanics, particle and nuclear physics, to name a few. For many of you, it may also be your first course in non-introductory physics. As a “survey” course, this is not a mathematically rigorous endeavor in which we will try to master every topic in tremendous detail. Rather, we are going to compress 5-6 courses into one semester, to give you an overview of these topics, and hopefully, a thirst to learn a lot more about them. However, being an “upper division” course, we will focus more on lecture and move at a fairly rapid clip, since there is a whole book full of fabulous material to cover.

If you didn't gather, I think this stuff is really neat and my first objective is sharing this with you. My second is to make sure that you don't get bogged down in lots of math and lose sight of the underlying physical principles. As we transition to more advanced material, remember, “physics” tells us *what* happens, and math tells us *how* to make predictions. Even in more advanced courses, if you can't explain what you've learned to your mom and dad over the phone (so that they understand) then you probably don't understand too well yourself. That, and solving homework problems, are probably the best tests for evaluating whether you need extra help. I also intend to prepare you for more advanced courses, so I will not simply lecture out of the book or assign “softball” problems. This will be a challenging course, and I expect you to take it seriously. This means keeping up with your readings, doing your work on time and in a timely manner, and challenging yourselves to complete all your assignments rather than “giving up” after a few minutes of struggling.

This brings me to my most important point. I am not here to teach myself, I already know the stuff. I am here to teach you. My involvement in your learning does not begin and end in the classroom. I keep office hours and an open-door policy for your benefit, not mine. I am interested in your feedback, and in helping you make the most of your time in college and at Goucher.

Attendance

Attendance is not mandatory and will not be taken. If you know you are going to miss a class, please have the courtesy to notify me ahead of time; you'll find that I will be much more receptive to meeting with you to go over what you missed.

Homework

Homework will be assigned roughly once every week. Handwritten work must be neat and legible. Be sure to clearly box or circle your final answer. Due dates will be posted with the assignment, and *no* homework will be accepted late without prior approval. You are

encouraged to work together on homeworks but blatant copying will be considered cheating (see below).

Exams

There will be three exams given during the course, roughly one every four weeks. No make-up exams will be offered. Exams will be closed book and closed notes. Calculators are allowed but use of programmable calculators with physics equations stored inside will be considered cheating. Any form of wireless communication during the test will be considered cheating. In lieu of a comprehensive final exam, you will submit a research paper with an oral presentation.

Final Projects

Each of you will choose a topic in modern physics and submit a research paper on the subject, due on the day of your final exam. Papers should be around 10 pages long in 12-point font, double spaced, and must have proper citations and references. Use of web-based (i.e. non peer-reviewed, such as blogs or wikipedia) material may not constitute any of your bibliographic sources. During the 2nd-to-last week of classes, you will make 20-minute oral presentations of your research. You may use any media you see fit for your presentation. Science fiction and speculative topics (e.g. wormholes, tachyons, super-luminal motion, transporter beams, etc) will not be accepted as topics. You must declare your topic to me in writing, and receive my approval, no later than Thanksgiving Break (but for your own sanity, don't put it off until then!). I will happily read and comment on drafts, provided you give me ample time, i.e. at least 48 hours.

Cheating

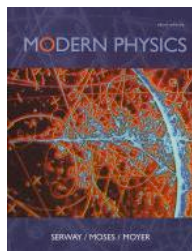
You are encouraged to work together on problem sets, however blatantly copying someone else's work is cheating. Cheating, whether on exams, homeworks, or your term paper will not be tolerated in any form. You are bound by the Goucher Honor code, and anyone caught or suspected of cheating will be immediately reported to the Honor Board as outlined in the Campus Guidebook.

Grading

Your grade will be composed of: 25% homework, 45% exams, and 30% final project (10% oral, 20% written). I will not drop any grades. There will be no extra credit offered. Grading will be based on your percentage out of the total points possible, following this scale:

A: 85 100%	B: 75 79%	C: 65 69%	D: 55 59%
A-: 82 85%	B-: 72 75%	C-: 62 65%	D-: 52 55%
B+: 79 82%	C+: 69 72%	D+: 59 62%	F: 0 52%

Required Text



Serway, Moses & Moyer
Modern Physics, 3rd Ed.
 Saunders College Publishing

Date	Ch.	Lesson
8/29-9/14	1-2	Special and General Relativity
9/3		No Class – Labor Day
9/17-9/21	3	Quantum Theory of Light
9/24-9/28	4	Particle Nature of Matter
10/1-10/8	5	Matter Waves
10/5	Exam	Ch 1–4
10/12		No Class – Fall Break
10/15-10/26	6	1-D Quantum Mechanics
10/29-11/2	7	Tunneling
11/5-11/12	8	3-D Quantum Mechanics
11/9	Exam	Ch 5–7
11/14-11/19	9	Atomic Structure
11/21-5		No Class – Thanksgiving
11/28-12/3	TBA	Choice of Topics
11/30		Oral Presentations
12/5	Exam	Ch 8-9 and chapter(s) of choice
Final Exam		Research Presentations