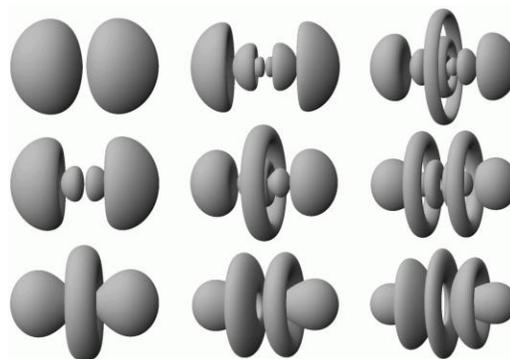


Physics 330: MATHEMATICAL METHODS OF THEORETICAL PHYSICS

Instructor: Jim Kelly

- **Office:** Olin 015
- **Office Hours:** MWRF 9:10-10:10am or by appointment
- **Email:** james.kelly@centre.edu
- **Phone** (859) 238-5915 (email is better than a phone message)
- **Course web site:** <http://web.centre.edu/james.kelly/>



Textbook: Mathematical Methods in the Physical Sciences by Mary L. Boas

Prerequisite: MAT 360 & PHY 230, or permission from me.

Content

Physics 330 introduces you to the beautiful mathematics used in theoretical physics. During the past two centuries physics has become increasingly mathematically sophisticated, and there is no sign of a slowing in this trend. In order to become a talented physicist or engineer these days you must be quite comfortable with mathematics that was once considered very abstract and obscure. On the other hand, in order to become a competent mathematician you must have a good knowledge of the physical origin of most mathematical structures. Unfortunately for us, there were far too many mathematical developments in physics from the 19th and 20th centuries to allow even a superficial coverage all of the useful topics in one term. The purpose of this course is to make you competent in a handful of the most beautiful of these areas which are used extensively in quantum mechanics and electrodynamics.

Items Affecting Your Course Grade

- **Quizzes:** We will have short weekly lecture quizzes worth 10 points each. Your lowest quiz score will be dropped. Quizzes emphasize recent material and encourage you to stay up-to-date. Quiz questions are not necessarily indicative of the difficulty of exam questions.
- **Exams:** We will have three 60-minute exams worth 100 points each. Exams are comprehensive, but emphasize material since the last exam. Contact me ASAP in the case of a missed exam due to an emergency.
- **Final Exam:** We will have a 3-hour final exam worth 200 points. The final exam is comprehensive.
- **Homework:** We will have regular weekly homework assignments, worth varying amounts and posted on the website. Your percentage on these will be applied to 60 points. In addition there may be other kinds of assignments that supplement the online problems for additional point credit.
- **Attendance:** Attendance is mandatory, and will be taken daily and reported to the Associate Dean. Tardiness will be treated as an unexcused absence. Each unexcused absence will lower your course point total by 8 points. Several types of excusable absences are listed below, but generally you should contact me about any absence ASAP. If I don't hear from you and you are absent, it will be treated as unexcused and will hurt your grade.
 - ❖ **Sporting events and other college-sponsored events:** In the event that you have an excused absence in which you have been cleared by the Associate Dean or athletic office for participation, let me know at least one week in advance in the event so that we may determine any potential class conflicts and decide how to proceed.
 - ❖ **Routine illness:** If you must miss class due to a routine illness or medical issue, you must communicate with me about it before the class is missed and we will discuss how best to work around it. If I do not hear from you before class begins (or via a doctor's note after the fact) it will be treated as unexcused.
 - ❖ **Severe illness and other emergencies:** In the event of sudden, severe illness or some other emergency in which you cannot send an email before class begins, communicate with me as soon as possible or have a friend let me know what's going on. It is good practice to contact the Associate Dean in the case of any extended or severe medical (or other) emergency.
- Late work is generally not accepted except in the case of excused absences, in which case we will work out alternative plans.
- Letter grades will be based on the percentage of points earned in the course :

A range:	"Excellent"	$A \geq 93\%$	$90\% \leq A- \leq 92.99\%$	
B range:	"Good"	$87\% \leq B+ \leq 89.99\%$	$83\% \leq B \leq 86.99\%$	$80\% \leq B- \leq 82.99\%$
C range:	"Satisfactory"	$77\% \leq C+ \leq 79.99\%$	$73\% \leq C \leq 76.99\%$	$70\% \leq C- \leq 72.99\%$
D range:	"Marginal"	$60\% \leq D \leq 69.99\%$		
U range:	"Unsatisfactory"			

You may calculate your grade at any time by calculating the percentage of points available to date that you have earned.

Notable Dates

9/28	Exam #1
10/13-10/14	Fall Break
10/26	Exam #2
11/23	Exam #3
11/23-11/25	Thanksgiving Break
12/7	Final Exam (1:30pm-4:30pm in our usual room)

Academic Honesty

Cheating includes copying answers on tests or assignments, glancing at nearby test papers, swapping papers, stealing, plagiarizing, and illicitly giving or receiving help on exams or assignments – in short, presenting another's work or ideas as your own. You are expected to conduct yourself with integrity. When you cheat, or aid someone else in cheating, you violate a trust. If you are suspected of cheating, the Associate Dean will be contacted immediately to schedule a meeting with you to discuss the issue.

Homework is one area that requires additional explanation. I encourage you work with classmates on the problems after you have attempted them. It is OK to discover the solution to a problem in a group, as long as you write up the solution to the problem yourself (in your own words) and you fully understand the solution. Obtaining homework help from someone in such a way that you cannot clearly explain how to do a similar problem by yourself is a form of cheating. That being said, I highly encourage you to work together on homework after you have become stumped.

Students with Special Medical Conditions or Disabilities:

If you have medical information to share with me in the event of an emergency, please contact me via email or come to see me during office hours. If you need adaptations or accommodations because of a disability, I refer you to the College's coordinator for disabilities, Dr. Mary Gulley (238-5223). A signed, laminated Accommodation Notice will be prepared to show your professors how and when accommodation is necessary.

Homework for Week 1 (due 9/5 in class) (Future assignments will appear on the class webpage.)

Monday 8/29: 2.4: 17; **2.9 :** 3,7,19 and the worksheet on the website. [Read 2.1-2.3, 2.9, 2.11, and the handout on the webpage]

Wednesday 8/31: Complete the worksheet on the website. [Read 3.1-3.4]

Friday 9/2: 3.2: 12,14 [Read 3.6]