

PHYS 605/480: Mathematical Physics I

MWF 11:00 – 11:50 AM

- Instructor:** Dr. Jason Kestner
Location: Use the Collaborate link in this course's Blackboard page
Virtual Office: <https://umbc.webex.com/meet/jkestner>
Office Hours: Almost anytime, with a bit of notice. Email for an appointment.
Email: jkestner@umbc.edu
Textbook: Riley, Hobson & Bence,
Mathematical Methods for Physics and Engineering, 3rd ed.
Other resources: Lay, *Linear Algebra and its Applications*
Youtube series, *The Essence of Linear Algebra*
Linear Algebra, <https://www.math.ucdavis.edu/linear/>

Course Description

This course covers the most common mathematical techniques used by physicists. I will assume you are already familiar with linear algebra and ordinary differential equations at the undergraduate level. You are responsible for reviewing these foundations as necessary (some students have found the “Other resources” above to be useful in reviewing undergraduate linear algebra). Major topics this semester will include linear vector spaces, partial differential equations, Sturm-Liouville theory, Green’s functions techniques, and complex variables. The primary objective of this course is for you, as a physicist, to acquire the basic tools of the trade and recognize how to apply them.

Remote Learning Logistics

As this course will be fully online within the Blackboard environment, you must have a reliable internet connection. You can test your connection speed at websites like <https://www.speedtest.net/>. 10Mbps download speed is recommended for smooth live streams of lectures. Note that using an ethernet cable or simply sitting closer to the router can improve your connection substantially.

I recommend the Chrome browser for best results with Blackboard.

Unless you have a tablet, you will need to download a scanner app to your phone (e.g., CamScanner) so that you can scan your handwritten homework/exams as a pdf and upload it to Blackboard.

If at all possible, you should also have a microphone and webcam to facilitate live interactions. While you may access recordings of the lectures on Blackboard Collaborate at your convenience and attendance will not be taken, I highly recommend you attend the lectures in real time. You will learn most efficiently when you are able to interact during lecture (asking questions, answering my questions, etc.). Feel free to use the chat window to (civilly!) communicate with other students during lecture, and use the “raise hand” button to get my attention. Outside of lecture, feel free to use the discussion boards on Blackboard. And of course, email me anytime for any reason and I should respond within 24 hours (usually much sooner).

Assignments

Homework will be assigned weekly. Late homework will generally not be accepted. Your work must be neat and well-organized. Grading is not simply based on whether you got the right answer. It is far more important that you show a clear and logical approach to the problem, even if you are unable to proceed all the way to the final answer. I cannot emphasize this enough! Your homework should not be just lines of math – it must be written with interspersed explanation as if you were writing a textbook, wikipedia entry, scientific paper, or etc. You are all scholars now, and your homework must reflect that.

Individual study is absolutely key to internalizing concepts, but consulting others (classmates, me, the internet) is also an essential part of scholarly practice and is a good way to overcome roadblocks. However, all submitted work must be your own. Copied or paraphrased work is unacceptable. It is fine to use somebody else’s idea in your solution, but you must include a citation.

You are recommended to solve additional, unassigned problems when possible. Extra time that you invest in this course will yield an ample return in the future.

Exams

There will be two midterm exams and one final exam. The final exam will be cumulative. All exams will be held online in a live, timed format.

Overall Grades

Your course grade will be determined by the following components:

Homework	35%
Midterm Exam 1	20%
Midterm Exam 2	20%
Final Exam	25%

This course will not be graded on a curve. Total scores translate to grades in the following way:

Score	605 grade	480 grade
90–100	A	A
88–90	A-	A
85–88	B+	B
81–85	B	B
78–81	B-	B
75–78	C+	C
71–75	C	C
68–71	C-	C
65–68	D	D
0–65	F	F

Academic Integrity in an Online Environment

Academic integrity is a core value at UMBC. By enrolling in this course, each student assumes the responsibilities of an active participant in UMBC's scholarly community in which everyone's academic work and behavior are held to the highest standards of honesty. Cheating, fabrication, plagiarism, and helping others to commit these acts are all forms of academic dishonesty, and they are wrong. Academic misconduct could result in disciplinary action that may include, but is not limited to, suspension or dismissal. These principles and policies apply in both face-to-face and online classes. Resources for students about academic integrity at UMBC are available at <https://academicconduct.umbc.edu/resources-for-students/>.