

PHY 605 and PHY 480 SYLLABUS, FALL 2023

- **COURSE OVERVIEW.** We will study linear vector spaces and elements of partial differential equations at a level suitable for first year graduate/advanced undergraduate students. A familiarity with linear algebra and ordinary differential equations (at the level of MATH 221 and MATH 225 taught at UMBC) is expected. More specifically, we will try to cover most or all of the following material:
- **Topics.** Linear vector spaces, inner product spaces, orthonormal bases, infinite dimensions, Dirac notation. Operators, matrices, and determinants. Integral and differential operators, eigenvalues and eigenvectors, subspaces, row and column subspaces. Eigenfunction methods for differential equations, Sturm-Liouville theory, partial differential equations and their classes, integral transform methods, inhomogeneous problems with Green's functions.
- **Resources.** We will rely on the notes that I will provide. These notes are based on the recommended books "Mathematical Methods for Physics and Engineering" by K.F Riley, M. P. Hobson, S. J. Bence (3rd edition, Cambridge University Press, ISBN 0-521-67971-0 and "Linear algebra done right" by Sheldon Axler, Springer, Second edition, ISBN 0-387-98258-2. A very good book for reviewing Linear Algebra is that by Strung (see also his MIT online lectures). The blackboard web page will be the announcement board of the course, where notes, homework, and announcements will be posted. You are expected to always be familiar with its content.
- **Instructor:** Markos Georganopoulos.
- **E-mail:** georgano@umbc.edu, tel: 202 286 3618.
- **Lecture, time and location:** Monday and Wednesday 2:00-3:15PM PHYS 201
- **Office Hours:** Monday and Wednesday, 12:00-1:00. 5PM in my office, room PHYS 415
- **Grading.** Homework (30%): Homework questions will provide good practice for the types of question likely to be posed in the mid term and final exams. A homework will be assigned every week, except for the week leading to the mid term exam. Students are expected to solve all the problems of the homework but are not required to turn them in. In the end of the class on the due-day of the homework, students will be

given 10 min to clearly reproduce the solution of one or more of the homework problems selected by me.

- Mid Term (30%): It will cover the material from the beginning of the class up to the lecture before the mid term. The time of the mid term will be announced in class at least a week in advance.
- Final Exam (40%): An exam at the end of the course on all the course material.
- Grading Scale: A: 85-100, B: 70-84, C: 60-69, D: 50-59, F: Below 50.
- IMPORTANT NOTE: Clear handwriting, proper English grammar and syntax, as well as logical flow of your arguments and no missing steps are required in all exams and homework.

UMBC Policies and Resources for Students

Academic Integrity

"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 on a test could result in disciplinary action that may include, but is not limited to, suspension or dismissal." More on the requirements of academic integrity can be found at <http://www.umbc.edu/gradschool/procedures/integrity.html>

Accessibility and Disability Accommodations, Guidance and Resources

Accommodations for students with disabilities are provided for all students with a qualified disability under the Americans with Disabilities Act (ADA & ADAAA) and Section 504 of the Rehabilitation Act who request and are eligible for accommodations. The Office of Student Disability Services (SDS) is the UMBC department designated to coordinate accommodations that creates equal access for students when barriers to participation exist in University courses, programs, or activities.

If you have a documented disability and need to request academic accommodations in your courses, please refer to the SDS website at sds.umbc.edu for registration information

Religious Observances & Accommodations

UMBC Policy provides that students should not be penalized because of observances of their religious beliefs, and that students shall be given an opportunity, whenever feasible,

to make up within a reasonable time any academic assignment that is missed due to individual participation in religious observances. It is the responsibility of the student to inform the instructor of any intended absences or requested modifications for religious observances in advance, and as early as possible. For questions or guidance regarding religious observance accommodations please contact the Office of Equity and Inclusion at oei@umbc.edu.

Hate, Bias, Discrimination and Harassment

UMBC values safety, cultural and ethnic diversity, social responsibility, lifelong learning, equity, and civic engagement.

Consistent with these principles, UMBC Policy prohibits discrimination and harassment in its educational programs and activities or with respect to employment terms and conditions based on race, creed, color, religion, sex, gender, pregnancy, ancestry, age, gender identity or expression, national origin, veterans status, marital status, sexual orientation, physical or mental disability, or genetic information.

Students (and faculty and staff) who experience discrimination, harassment, hate or bias or who have such matters reported to them should use the online reporting/referral form to report discrimination, hate or bias incidents. You may report incidents that happen to you anonymously.

Pregnant and Parenting Students

UMBC's Policy on Sexual Misconduct, Sexual Harassment and Gender Discrimination expressly prohibits all forms of Discrimination and Harassment on the basis of sex, including pregnancy. Resources for pregnant, parenting and breastfeeding students are available through the University's Office of Equity and Inclusion. Pregnant and parenting students are encouraged to contact the Title IX Coordinator to discuss plans and ensure ongoing access to their academic program with respect to a leave of absence or return following leave related to pregnancy, delivery, adoption, breastfeeding and/or the early months of parenting.

Pregnant students and students in the early months of parenting may be entitled to accommodations under Title IX through the Office of Equity and Inclusion.

