

Course Information**Instructor:** Dr. Justin T. Webster (Justin)**Lecture:** M,W,F - 10:00–10:50 am, Physics 101 (Section 1) **Discussions:** W - 8:00–8:50 am (Secs. 2–3); 9:00–9:50 am (Secs. 4–5)**TAs:** Nico Bartolomeo (undergraduate) – nicolab2@umbc.edu
Nathan Tamiru (PhD student) – mr53017@umbc.edu**Course Website:** Blackboard (not instructor homepage).**Office Hours (OH):** T 10:30–11:30am, W 12:30–1:30pm; and by appt.***Required Text:** Marsden and Tromba, *Vector Calculus*, 6th Ed. (eBook, accessed through CMI).*Prerequisite:* MATH 152 with a grade of “C” or better.Contact Information**Phone:** 410/455-2183**Email:** websterj@umbc.edu**Office:** M&P 430**Joint TA Office Hours:** M
1:00–2:30pm, Location: TBD

The following are the course policies. They may be changed at any time and will be announced *in class and by e-mail*.

Contacting Me: The best way to contact me is via email. I will respond within 36 hours. **Please schedule all appointments outside of OH through e-mail, with at least 24 hours’ notice.* Students are responsible for all announcements made in class, on Blackboard, and any e-mail sent to their primary UMBC email account. Check Blackboard often.

The Level and Purpose of This Course: MATH 251 is a 200-level course, not a 100-level extension of single variable calculus. You will be treated as such, and *you are responsible for your own academic journey*. All learning is active, and “listening to lecture” will not yield learning, nor a decent grade. You will need to engage with the text, come to office hours, and do the suggested homework to be successful.

Reading and Course Texts: The course necessitates *out of class* reading—examples, definitions, theorems, and proofs. As such there will be weekly required reading (with due dates). Often the reading will be due before content is presented in lecture. *The primary purpose of the text is to provide additional examples and discussion. Use it!*

Reading is required course work even though it does not receive a separate grade. Once material has been assigned for reading, it is valid material for a quiz or activity, including conceptual or historical information.

MacMillan *Achieve* access includes the e-book and the online homework practice system, and is required. However, it is *strongly recommended that you purchase a physical copy* of Marsden-Tromba. This is one of the most useful books for students continuing in mathematics, engineering, physics, and other quantitative fields.

Suggested Homework and Achieve Practice: Suggested textbook problems and practice problems will be given every week. They will not be collected and will receive no course credit. The purpose is practice and preparation for quizzes, activities, and exams. The suggested homework will strongly inform those problems. Achieve may be used for practice and instant feedback. If you are struggling with a problem, bring it to instructor or joint TA office hours.

Activities and Quizzes: A graded activity or quiz will occur each Wednesday during discussion, which will ordinarily be led by the TAs. The item may be longer (up to 50 minutes) or shorter, depending on the material, but each session will be worth the same number of points. The format may vary between individual quizzes, group activities, mixed-format sessions, or study/review activities. *No make-ups will be granted, but each student will be permitted two Wednesday drops. These drops cover all reasons for absence or non-submission, not merely low scores.*

Exams: There will be two in-class, 50 minute midterm exams and one 120-minute comprehensive final exam. The final will be common and co-written across the two coordinated sections. Once the final exam time is announced, it will be fixed, and only in the most extreme cases will arrangements be made to reschedule.

Midterm Exam 1 - Friday, October 2 **Midterm Exam 2** - Friday, November 6

Final Exam Date and Time - Monday, 12/14, 1–3pm; **Final Exam Room** - LH1 101

Notes Policy: Books, notes, and calculators are not allowed for any quizzes or exams. You may ask me or a proctor for a hint, clarification, or formula during an assessment; whether and how much help is given is at our discretion.

Grading: Grades will be assigned based on raw percentages in the standard 100 percent scale (with no “+” or “-”). *During the semester, grades will not be rounded, and there will be no curve for graded material.* However, I reserve the right to adjust final grades based on factors such as attendance, participation, and demonstrated effort towards understanding the material (always “upward”, if at all). The final grade breakdown will be as follows:

Midterm Exams – 20% x 2 Activities and Quizzes – 25% Final Exam – 35%

Course Description and Outcomes: Students are expected to display a thorough understanding of the topics covered. In particular, upon completion of the course students should be able to:

SLO1) Work fluently with vectors and geometry in $\mathbb{R}^3$ (dot/cross products, lines/planes, basic surfaces) and use parameterizations to describe curves and surfaces.

SLO2) Compute and interpret partial derivatives, tangent planes, linearization, and the multivariable chain rule; use directional derivatives and the gradient as geometric and modeling objects.

SLO3) Solve optimization problems in several variables and interpret solutions; *optional enrichment* may include Lagrange multipliers when time and section readiness permits.

SLO4) Set up and evaluate double and triple integrals; describe regions correctly; choose effective coordinate systems (polar/cylindrical/spherical) and bounds with minimal prompting.

SLO5) Understand vector fields and line integrals; compute work/circulation; identify and apply criteria for conservative fields and potentials (path independence / fundamental theorem for line integrals).

SLO6) Use Green’s theorem in both circulation and flux forms; connect planar divergence/curl intuition with boundary-vs-interior reasoning and apply the theorem in varied contexts.

SLO7) Compute and interpret surface integrals (scalar and flux) with correct orientations; understand divergence and curl as operators and relate them to flux/circulation through integral identities.

SLO8) Apply Stokes’ and Divergence theorems to compute circulation/flux and to reason conceptually; select appropriate tools, check hypotheses, and communicate solutions with correct and precise mathematical language.

These outcomes will be assessed on exams, quizzes/activities, and the final exam.

Etiquette, Please: Make sure your phone is silent and put away. *Laptops cannot be used in class* unless explicitly permitted or required by an approved accommodation. I will call you out. If in attendance, arrive on time and commit to sitting through the entire lecture. Lastly, please comment and ask questions by raising your hand.

Attendance: Attendance will not factor into the overall grade, but there are obvious ramifications for missing more than a couple class sessions, especially Wednesday quiz/activity sessions.

Important Dates: Please be aware of the following dates:

Schedule adjustment deadline – Sep. 4	Labor Day – Sep. 7	Fall Recess – Oct. 12–13
Withdraw deadline – Nov. 2	Thanksgiving/Class Recess – Nov. 25–27	Last day of classes – Dec. 9
Study Day – Dec. 10	Finals – Dec. 11–17	

Academic Integrity, Collaboration, and AI: Have some integrity! Be a good person, please. Be a person who does not cheat. Mathematical collaboration is encouraged in this course: students should discuss definitions, examples, strategies, and difficult points with one another. Study groups are great!

AI tools can be useful for suggested homework and practice problems, but be careful about overuse and over-reliance. The instant answer can become a dopamine hit, and repeatedly outsourcing the struggle can prevent you from actually learning the mathematics. If you use AI for practice, use it as a secondary tool after attempting the problem yourself; do not use it as a replacement for reading, thinking, and doing mathematics.

Generative AI and LLM tools (including ChatGPT, Claude, Gemini, etc.) may not be used on any proctored assessment. AI use on a quiz, midterm, or final will result in a score of zero for the entire assessment, not merely the problem in question, and Academic Conduct Reporting.

Integrity interviews: If the instructor or TA has reason to question the authorship or understanding represented by an assessment, no grade will be assigned until an academic integrity interview has occurred. This will be conducted by the instructor with at least one other person (TA, instructor, other faculty). The student will be required to clearly explain submitted answers, strategy, notation, and solution choices, and may be asked to solve related problems in real

time. The grade on the entire assessment is contingent upon the student's satisfactory demonstration of understanding and authorship. An unsuccessful interview concerning even a single problem will result in a score of zero for the entire assessment and Academic Conduct Reporting.

The presence of a phone or tablet outside a pocket or bag, or the wearing of a smart device (watches or glasses), is sufficient grounds for a zero on the assessment; no evidence of use is required.

Do not do it. It is not worth it. Resist the temptation. You are in this class for a reason!

Course Evaluations and Feedback: I take course evaluations seriously, and as such, I would ask that you complete them. Please provide objective and honest feedback in as much detail as you can. Additionally, polite feedback about the course (during the semester) is encouraged.

Other Stuff:

UMBC Academic Integrity Policy: Academic integrity is an important 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 forms of academic dishonesty, and they are wrong. Academic misconduct may result in disciplinary action, including suspension or dismissal. The UMBC Statement of Values for Academic Integrity and the Undergraduate Student Academic Conduct Policy are available at <https://academicconduct.umbc.edu/>.

Athletes, Veterans, and Other Considerations: If you are an NCAA or club-sports athlete, a veteran, or have another circumstance that may affect your participation in the course, please inform me as early as possible. Information for veterans and military-affiliated students is available at <https://veterans.umbc.edu/>. Scheduling arrangements and other course-specific needs will be considered individually and in accordance with University policy.

Accessibility and Disability Accommodations, Guidance and Resources: UMBC is committed to providing equal access for students with disabilities under the Americans with Disabilities Act (ADA and ADAAA) and Section 504 of the Rehabilitation Act. Student accommodation requests are coordinated through Office of Disability Access & Resources (DAR), within UMBC's Office of Accessibility and Disability Services. Registration information, procedures, and the Accommodate student portal are available at <https://sds.umbc.edu/>; broader accessibility resources are available at <https://accessibility.umbc.edu/>. SDS can be reached at disAbility@umbc.edu or 410-455-2459.

If you will use approved accommodations in this course, please ensure that you have submitted a Semester Request and that SDS has emailed your Letter of Accommodations to me. Then contact me promptly so that we can discuss the implementation of those accommodations. Accommodations are not retroactive, so early communication is strongly encouraged.

Sexual Assault, Sexual Harassment, and Gender-Based Violence and Discrimination: UMBC policy, in addition to federal and state law (including Title IX), prohibits discrimination and harassment on the basis of sex, sexual orientation, and gender identity in University programs and activities. A student impacted by sexual harassment, sexual assault, domestic violence, dating violence, stalking, sexual exploitation, gender discrimination, pregnancy discrimination, gender-based harassment, or related retaliation may contact the University's Title IX Coordinator to make a report and/or access support and resources. The Title IX Coordinator can be reached at ecr@umbc.edu or 410-455-1717. Information and reporting resources are available through the Office of Equity and Civil Rights at <https://ecr.umbc.edu/>.

Support and resources are available even when a student does not wish to file a formal complaint or police report. Please be aware that the University may take action on its own when necessary to protect the safety of the community. Reports may be submitted through the online reporting/referral form linked from the ECR website; anonymous reporting may limit the University's ability to respond.

Notice that Faculty and Teaching Assistants are Mandated Reporters with Mandatory Reporting Obligations: All faculty members and teaching assistants are Mandated Reporters under UMBC's Interim Policy on Sex Discrimination, Sex-Based Harassment, and Sexual Misconduct. Faculty and teaching assistants are therefore required to report known information concerning conduct that may violate the policy to the Title IX Coordinator, including

disclosures about experiences that occurred before a student attended UMBC or that involve people not affiliated with UMBC. Reports are required regardless of the amount of detail provided and even when support has already been offered or received.

While faculty members want to encourage students to share information related to their life experiences through discussion and written work, students should understand that faculty and teaching assistants must report past and present sexual harassment, sexual assault, domestic and dating violence, stalking, and gender discrimination shared with them. The purpose of that report is to allow the University to inform students of their rights, resources, and support. A student is not obligated to respond to outreach resulting from a report.

If you need to speak with someone confidentially, UMBC maintains confidential resources, including Retriever Integrated Health (410-455-2472; after-hours support: 988), pastoral counseling through The Gathering Space for Spiritual Well-Being (410-455-6795; i3b@umbc.edu), and the Women's, Gender, and Equity Center (410-455-2714; womenscenter@umbc.edu). Current hours and additional on- and off-campus resources are available at <https://ecr.umbc.edu/>.

Please note that Maryland law and UMBC policy require faculty to report disclosures or suspicions of child abuse or neglect to the Department of Social Services and/or the police, even if the person who experienced the abuse or neglect is now over 18.

Pregnant and Parenting Students: UMBC's Interim Policy on Sex Discrimination, Sex-Based Harassment, and Sexual Misconduct prohibits discrimination and harassment on the basis of sex, including pregnancy. Resources for pregnant, parenting, and breastfeeding students are available through the Office of Equity and Civil Rights. Students are encouraged to contact the Title IX Coordinator to discuss continued access to their academic program, including leave, return from leave, or accommodations related to pregnancy, childbirth, adoption, breastfeeding, or the early months of parenting. A pregnancy-related impairment that qualifies as a disability under the ADA may also entitle a student to accommodations through DAR.

Religious Observances & Accommodations: UMBC policy provides that students should not be penalized because of observances of their religious beliefs and that, whenever feasible, students should have a reasonable opportunity to make up academic work missed because of a religious observance. Students are responsible for informing the instructor of intended absences or requested modifications in advance and as early as possible. Questions may be directed to the Office of Equity and Civil Rights at ecr@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, activities, and employment based on protected status. Students, faculty, and staff who experience or learn of discrimination, harassment, hate, or bias may use the online reporting/referral form available through <https://ecr.umbc.edu/>. Incidents may be reported anonymously, although anonymity may limit the University's ability to respond.