

MATH 9100 FALL 25

VANDERBILT UNIVERSITY

1. GENERAL INFORMATION

Instructor: Marcelo Disconzi. Office: A1017, 17th & Horton (Sony bld). Office phone: 322-7147.
email: marcelo.disconzi@vanderbilt.edu.

Lecture time and location: Tue–Thu, 1:15–2:30pm, Stevenson Center 1312.

Course webpage:

<https://www.disconzi.net/Teaching/MAT9100-Fall-25/MAT9100-Fall-25.php>

Office hours: Tue, 4:10–6:10pm, Thu 12–10pm, or by appointment.

Math Office: Stevenson Center 1326.

2. COURSE INFORMATION

2.1. **Textbook.** No textbook will be adopted. Some suggested references are

- Disconzi, M.M.; Ifrim, M.; Tataru, D. *The relativistic Euler equations with a physical vacuum boundary: Hadamard local well-posedness, rough solutions, and continuation criterion*, arXiv:2007.05787 [math.AP].
- Disconzi, M. M. *Recent developments in mathematical aspects of relativistic fluids*, arXiv:2308.09844 [math.AP].
- Disconzi, M. M.; Speck, J. *The relativistic Euler equations: Remarkable null structures and regularity properties*, arXiv:1809.06204 [math.AP].
- Disconzi, M. M.; Speck, J. *The Einstein-Euler system with a physical vacuum boundary*, TBP.

2.2. **Prerequisites.** Knowledge of analysis and PDEs is expected.

2.3. **Description.** We will present some recent results in relativistic free-boundary fluids, with an emphasis on relativistic fluids with a physical vacuum boundary. We will discuss local well-posedness of the relativistic Euler equations with a physical vacuum boundary in a fixed background and of the Einstein-Euler system with a physical vacuum boundary in spherical symmetry. If time allows, other related topics will be presented

3. GRADING POLICY

Grades will be assigned based on class participation, with the distribution:

Final grade range (rounded)	Letter grade
95–100	A
90–94	A–
87–89	B+
84–86	B
80–83	B–
77–79	C+
74–76	C
70–73	C–
67–69	D+
64–66	D
60–63	D–
<60	F

3.1. Assignments and schedule. An up-to-date schedule will be maintained on the course web-page.

4. COURSE POLICIES

4.1. Classroom Policy. Students are allowed to use electronic equipment in class for their academic benefit, such as tablets, laptops, etc. If you do so, make sure your equipment is in silent mode.

4.2. Honor Code. All work submitted for credit must be the student's own and is subject to the provisions of the Vanderbilt Honor Code. Details can be found at the Honor Council web site: <https://studentorg.vanderbilt.edu/honorcouncil/>.

4.3. Classroom recording policy. The use of technologies for audio and video recording of lectures and other classroom activities is allowed only with the express permission of the instructor. In cases where recordings are allowed, such content is restricted to personal use only unless permission is expressly granted in writing by the instructor and by other classroom participants, including other students. Personal use is defined as use by an individual student for the purpose of studying or completing course assignments. When students have permission for personal use of recordings, they must still obtain written permission from the instructor to share recordings with others.

4.4. Vanderbilt AI policy. Vanderbilt's AI policy:

<https://cdn.vanderbilt.edu/vu-URL/wp-content/uploads/sites/439/2023/11/29200845/Academic-Affairs-Guidance-for-Artificial-Intelligence-Nov-29-2023.pdf>
applies to this course.

4.5. Calculators. Calculators or other electronic devices will not be used on the tests.

4.6. Accommodation Procedure. A student who needs course accommodations due to a disability, special arrangements in case the building must be evacuated, or has emergency medical information that needs to be shared with the instructor, should contact the instructor as soon as possible. Equal Opportunity and Access (EOA) (<https://www.vanderbilt.edu/eoa/>) at Vanderbilt provides specific accommodations for students with physical or learning disabilities. Upon receiving appropriate documentation from the student, EOA will make arrangements with the instructor for the accommodations.

4.7. Attendance. The student who misses a class meeting is responsible for any assignments and/or announcements made. **Office hours will not be utilized to re-teach material presented in class.** The stated attendance policy of the College of Arts and Science applies in this course: Students are expected to attend all scheduled meetings of classes in which they are enrolled; they have an obligation to contribute to the academic performance of all students by full participation in the work of each class. The faculty of the College of Arts and Science recognizes that occasions arise during the academic year that merit the excused absence of a student from a scheduled class or laboratory during which an examination, quiz, or other graded exercise is given. Examples include participation in sponsored university activities (e.g., debate team, varsity sports), observance of officially designated religious holidays, serious personal problems (e.g., serious illness, death of a member of the student's family), and matters relating to the student's academic training (e.g., graduate or professional school interviews). Conflicts arising from personal travel plans or social obligations do not qualify as excused absences.

4.8. Anonymous feedback. Students are encouraged to bring suggestions and to discuss with the course instructor any concerns they may have, including something they think is not being properly handled in the course. But if you do not feel comfortable about doing that, you have the opportunity to send some anonymous feedback on the course webpage.

5. STUDENT MENTAL HEALTH

Students may experience stressors that can impact both their academic experience and their personal well-being. These may include academic pressure and challenges associated with relationships, mental health, alcohol or other drugs, identities, finances, etc. If your struggles are interfering with your academics, please contact me so that we can find solutions together to help you succeed in my class. To help address these concerns, Vanderbilt offers the following resources:

- **University Counseling Center:** Offers individual and group therapy, psychiatric services, and assessments. The UCC also provides Urgent Care Counseling in person from 9 am - 4 pm, Monday through Friday, or 24/7 by phone. For more information, call 615-322-2571, visit vu.edu/scn, or connect with Student Care Coordination (SCC) where most referrals to the UCC begin.
- **Center for Student Wellbeing:** Focuses on creating a supportive environment for personal and academic success. Call 615-322-0480 or email healthydores@vanderbilt.edu to learn more.
- **Student Care Coordination:** Helps students navigate campus and community resources for academic and personal support. For assistance, call 615-343-9355 or visit <https://www.vanderbilt.edu/studentcarenetwork/>.
- **Crisis Text Line:** For free 24/7 support, text VANDY to 741741.
- **National Suicide & Crisis Lifeline:** Call or text 988 for 24/7 confidential support.