

# PHYS 621 - Atmospheric Physics I

## Fall 2021

**INSTRUCTOR:** Dr. Adriana Rocha Lima  
**Email:** limadri1@umbc.edu  
**Office:** Physics Building, Room 425

**Dates and Location:**

Tuesday & Thursday, 11:30AM - 12:45PM  
Building: Sherman Hall - Room 007

**OFFICE HOURS:** Friday, 9:00AM - 10:00AM

**Coarse Description:**

Composition and structure of the Earth's atmosphere, application of thermodynamics to atmospheric problems, development of the fundamental equations of fluid motion, applications to synoptic scale atmospheric circulations, boundary layer effects, global circulation, and other selected topics.

**Learning Goals:**

**By the end of the course, you should be able to:**

- Identify important physical processes that occur in the Earth's atmosphere.
- Understand basic thermodynamic concepts, such as the hydrostatic balance, potential temperature, air parcel, the thermodynamics of the water vapor, and saturated adiabatic lapse rate.
- The use of the tephigram to represent the vertical structure of temperature and moisture.
- Understand the fluid-dynamic laws that govern the atmospheric flows and apply the continuity equation and the Navier-Stokes equations to solve atmospheric phenomena.
- Comprehend the dynamic phenomena in the atmosphere, such as vorticity and potential vorticity, atmospheric waves, and atmospheric instability.

**Textbooks recommended in this course:**

1. Wallace, J.M. and P. V. Hobbs, Atmospheric Science: An Introductory Survey, Second Edition, Elsevier, 2006.
2. David G. Andrews, An Introduction to Atmospheric Physics, Second Edition, Cambridge University, 2010.
3. Holton, James R., An Introduction to Dynamics Meteorology, Fifth Edition, Academic Press. Elsevier 2013.
4. Murry L. Salby, Fundamentals of Atmospheric Physics, Academic Press, 1996.

**GRADING:**

Homework: 30%,  
Class Activities: 10%,  
Midterm Exam: 20%,  
Final Exam: 20%,  
Final Project: 20%.

The Final Project will consist of two parts: Oral Presentation 10%, and Final Report 10%.

**A: 100 – 90; B: 89 -75; C: 74-60; D: 59-50; F: Below 50.**

**Late homework policy:**

I do NOT accept late homework.

**Class Attendance and Missed Work**

Absences from class and missed work are accommodated (excused) in five circumstances: 1) illness, 2) personal instances of distress or emergency, 3) religious observance, and 4) varsity athletic participation and 5) required court or legal appearances. For each circumstance, you will need to present to the instructor supporting evidence (e.g., doctor note).

**At a Glance: UMBC Policies and Resources for Students****UMBC's Vision Statement**

Our UMBC community redefines excellence in higher education through an inclusive culture that connects innovative teaching and learning, research across disciplines, and civic engagement. We will advance knowledge, economic prosperity, and social justice by welcoming and inspiring inquisitive minds from all backgrounds.

**Academic integrity in the Online Instruction Environment**

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 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/>.

**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](http://sds.umbc.edu) for registration information and office procedures.

SDS email: [disAbility@umbc.edu](mailto:disAbility@umbc.edu)

SDS phone: (410) 455-2459

If you will be using SDS approved accommodations in this class, please contact me (instructor) to discuss implementation of the accommodations. During remote instruction requirements due to COVID, communication and flexibility will be essential for success.

### **Religious Observances & Accommodations**

UMBC Policy provides that students should not be penalized because of observances of their religious beliefs, 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 for religious observances in advance, and as early as possible. For questions or guidance or to request an accommodation, please contact the Office of Equity and Inclusion at [oei@umbc.edu](mailto: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; reporting may be anonymous.

### **Sexual Assault, Sexual Harassment, Gender Based Violence and Discrimination**

UMBC's Policy on Sexual Misconduct, Sexual Harassment and Gender Discrimination and Federal Title IX law prohibit discrimination and harassment on the basis of sex, sexual orientation, and gender identity in University programs and activities. Any student who is impacted by sexual harassment, sexual assault, domestic violence, dating violence, stalking, sexual exploitation, gender discrimination, pregnancy discrimination, gender-based harassment or retaliation should contact the University's Title IX Coordinator to make a report and/or access support and resources:

Mikhel A. Kushner, Title IX Coordinator (she/they)

410-455-1250 (direct line), [kushner@umbc.edu](mailto:kushner@umbc.edu)

You can access support and resources even if you do not want to take any further action. You will not be forced to file a formal complaint or police report. Please be aware that the University may take action on its own if essential to protect the safety of the community.

If you are interested in or thinking about making a report, please see the Online Reporting/Referral Form. Please note that, while University options to respond may be limited, there is an anonymous reporting option via the online form and every effort will be made to address concerns reported anonymously.

Notice that Faculty are Responsible Employees with Mandatory Reporting Obligations:

All faculty members are considered Responsible Employees, per UMBC's Policy on Sexual Misconduct, Sexual Harassment, and Gender Discrimination. Faculty are therefore required to report possible violations of the Policy to the Title IX Coordinator, even if a student discloses something they experienced before attending UMBC.

While faculty members want encourage you to share information related to your life experiences through discussion and written work, students should understand that faculty are required to report past and present sexual assault, domestic and interpersonal violence, stalking, and gender discrimination that is shared with them to the Title IX Coordinator so that the University can inform students of their rights, resources and support.

If you need to speak with someone in confidence, who does not have an obligation to report to the Title IX Coordinator, UMBC has a number of Confidential Resources available to support you:

- The Counseling Center: 410-455-2472 / After-Hours 410-455-3230 [Monday – Friday; Academic Year: 8:30 a.m. – 5 p.m.; Summer: 8:30 a.m. – 4:30 p.m. ]
- University Health Services: 410-455-2542 [Monday – Friday 8:30 a.m. – 5 p.m.]
- Pastoral Counseling via Interfaith Center: 410-455-3657; [interfaith@umbc.edu](mailto:interfaith@umbc.edu) [7 days a week; Fall and Spring 7 a.m. – 11 p.m.; Summer and Winter 8 a.m. – 8 p.m.]

Other Resources:

- Women's Center (for students of all genders): 410-455-2714; [womenscenter@umbc.edu](mailto:womenscenter@umbc.edu). [Monday-Friday; Spring 10 a.m.-4 p.m.]
- Shady Grove Student Resources, Maryland Resources, National Resources.

Child Abuse and Neglect:

Please note that Maryland law and UMBC policy require that I report all disclosures or suspicions of child abuse or neglect to the Department of Social Services and/or the police.

**Pregnancy**

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 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 assure ongoing access to their academic program with respect to a leave of absence or return following leave related to pregnancy, delivery, or the early months of parenting.

In addition, students who are pregnant may be entitled to accommodations under the ADA through the Student Disability Service Office, and/or under Title IX through the Office of Equity and Inclusion. The latest language is available on <https://oei.umbc.edu>.