METR 6413, Sec. 1 Topics in Advanced Mesoscale Meteorology (as of 18 Aug. 2022; may be updated as necessary)

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* Since I will be working at home part of the time, I may not be reachable at my office all the time. I am avoiding going into the NWC until the pandemic ends for your and my safety. Please e-mail me if you need to talk to me and give me your cell number if necessary, when you e-mail. I would prefer if you did not call my cell unless there is an emergency. We can schedule a meeting via Zoom if you would like instead of communicating via cell phone. I can usually linger at the class meeting after it has ended if you have any immediate questions.

Class meeting: Tuesdays and Thursdays at 10 – 11:15 AM in the classroom (NWC 5930) (via Zoom if I am out of town and can meet at the regular class time; otherwise, we may have to schedule an additional in-class or Zoom meeting at a mutually agreeable time) At the time of this writing, I expect to be away at the hail workshop in late Sept., the Severe Local Storms conference in late Oct., and possibly one or two other scheduled out-of-town meetings from time to time, as most faculty do. I will try to make up missed classes. I have decided not to attend ERAD in late Aug./early Sept., but may attend certain sessions virtually. I will try to avoid doing so during class meeting time.

Zoom meeting number: To be provided later.

Zoom password: To be provided later.

The internet on my end or on your end sometimes may be intermittent. If the internet is intermittent then my/your connection should be automatically rebooted if service is restored within several minutes or so. If your home/office connection is totally lost, please e-mail me if you can via your cell phone if you have cell phone internet. I should have backup internet connections via my T-Mobile card and also via my AT&T cell phone through an iPad hot spot if the house/hotel, etc. connection goes down; I will also try to contact you via my cell phone internet e-mail if necessary.

All lectures given by Zoom will be recorded and available if you wish. I will post them on the class website (see below). I will also make my notes available on the class website and Canvas (caveat emptor – they are rough!). If you must miss a lecture, but can attend via Zoom, let me know and I will try to deliver the lecture both in person and via Zoom. If you must miss an entire lecture, then I may give the lecture via Zoom, while students are in class in person, but will record the lecture for you specially. Office hours: Since I will be working at home often and the course has relatively low enrollment (under 10), there will not be formally-scheduled office hours. Please e-mail me if you wish and we can set up a Zoom meeting at a mutually convenient time. Or, you may follow me back to my office after class and if I do not have another appointment then, we can meet.

Prerequisites: METR 4123 (senior-level synoptic meteorology) or equivalent, METR 5113 (graduate –level dynamics) or the equivalent, and METR 5413 (graduate-level synoptic meteorology) or the equivalent. Ability to access, plot, and make computations of weather data at OU would also be helpful.

Required text: Synoptic-Dynamic Meteorology in Midlatitudes, Vol. II: Observations and Theory of Weather Systems by H. Bluestein, 1993, Oxford Univ. Press.

Supplemental material: *Synoptic-Dynamic Meteorology in Midlatitudes, Vol. I: Principles of Kinematics and Dynamics* by H. Bluestein, 1992, Oxford Univ. Press.; *Mesoscale Meteorology in Midlatitudes* by P. Markowski and Y. Richardson, 2010, Wiley, and journal articles, notes, and/or other similar material (notes to be provided).

Major topics (not necessarily in order):

- 1. Symmetric instability; conditional symmetric instability; applications to mesoscale bands of precipitation.
- 2. Topographic/orographic interactions Froude number a. Kelvin waves
 - b. density currents; trapped density currents and the barrier jet; gap winds; Puget Sound convergence zone
 - c. bores
 - d. orographic mesoscale eddies vortices in the wake of isolated mountains; the Catalina eddy; the Denver convergence - vorticity zone (mixed-layer theory); banner clouds
 - e. mountain waves evanescent, vertically propagating, trapped lee waves; rotors: wave clouds; mountain waves and downslope windstorms
- 3. Gravity waves in the absence of orographic forcing; Kelvin-Helmholtz waves
- 4. Solenoidal vertical circulations: Sea-breeze front; mountain-valley wind systems; katabatic winds; dryline circulation; nocturnal low-level jet in the Great Plains and its diurnal variability; Lake-effect precipitation
- 5. Precipitation bands in extratropical cyclones (mainly descriptive, but with some thought given to possible physical mechanisms)
- 6. Precipitation and orography: Enhancement and suppression
- 7. Horizontal convective rolls

I cannot give precise days for the lectures for these topics. I adjust them each time I teach this course and vary the topics. Topics 1 - 4 will definitely be covered. If we run out of time, I will rush through topics 5 - 7, which are more descriptive.

Grades*: 1/2 Mid-term exam (in-class exam, probably in mid-October)

1/2 Term paper (due last day of class); brief oral presentation on last day of class (or sooner)

There will NOT be a final exam.

I generally grade on a curve, but I will consider the overall grade distribution on your exams and papers, and may give out a disproportionate number of A's or B's, or even all the same grade.

*There will be some problem sets to aid you in understanding the class material. If you hand in all your problem sets, then in case of a borderline grade I will upgrade your grade.

Course-related information (e.g., problem sets, solutions, supplementary material) to be disseminated at the class site <u>http://weather.ou.edu/~hblue/metr6413</u> and on Canvas.

Boiler-plate information I must provide:

Course policy (misc.):

- 1. Plagiarism and cheating will not be tolerated.
- 2. If a student cannot take the exam for health or personal reasons, I will try to find a mutually acceptable solution.
- 3. I expect you to attend classes, unless you have a health-related or personal problem, or must be out of town at a meeting, etc. Please be sure to let me know when you will not be in class. If so, I will try to broadcast and record the lecture via Zoom.
- 4. Please don't come to class in person if you have a communicable illness. The ventilation may not be adequate in the classroom and we don't want you to infect fellow students (and the instructor). Feel free to wear a mask if you wish at any time, but it is not mandatory.
- 5. If you feel uncomfortable by language that I use (pun, metaphor, etc.), please let me know right away! I in no way intend to offend anyone. I try speak freely and it is difficult sometimes not to try to inject levity into my lectures. However, I do understand that my view of levity may not seem so to some students. Let me know after class, please, and don't let ill feelings fester.

The following are directly from OU:

Academic honesty is incredibly important within this course. Cheating is strictly prohibited at the University of Oklahoma, because it devalues the degree you are working hard to get. As a member of the OU community, it is your responsibility to protect your educational investment by knowing and following the rules. For specific definitions on what constitutes cheating, review the <u>Student's Guide to Academic Integrity</u>.

To be successful in this class, all work on exams and quizzes must be yours and yours alone. You may not receive outside help on assessments. On examinations and quizzes, you will never be permitted to use your notes, textbooks, calculators, or any other study aids. Should you see someone else engaging in this behavior, I encourage you to report it to myself or directly to the Office of Academic Integrity Programs. I encourage this because when someone else cheats, it can negatively impact the reputation of our entire program. It is my professional obligation to report academic misconduct, which I will not hesitate to do. Sanctions for academic misconduct can include expulsion from the University and an F in this course, so don't cheat. It's simply not worth it.

It is the policy of the University to excuse the absences of students that result from religious observances and to reschedule examinations and additional required classwork that may fall on religious holidays, without penalty. [See Faculty Handbook 3.15.2]

The Accessibility and Disability Resource Center is committed to supporting students with disabilities to ensure that they are able to enjoy equal access to all components of their education. This includes your academics, housing, and community events. If you are experiencing a disability, a mental/medical health condition that has a significant impact on one or more life functions, you can receive accommodations to provide equal access. Possible disabilities include, but are not limited to, learning disabilities, AD(H)D, mental health, and chronic health. Additionally, we support students with temporary medical conditions (broken wrist, shoulder surgery, etc.) and pregnancy. To discuss potential accommodations, please contact the ADRC at 730 College Avenue, (ph.) 405.325.3852, or <u>adrc@ou.edu</u>.

Anyone who has been impacted by gender-based violence, including dating violence, domestic violence, stalking, harassment, and sexual assault, deserves access to resources so that they are supported personally and academically. The University of Oklahoma is committed to offering resources to those impacted, including: speaking with someone confidentially about your options, medical attention, counseling, reporting, academic support, and safety plans. If you would like to speak with someone confidentially, please contact OU Advocates (available 24/7 at 405-615-0013) or another confidential resource (see "Can I make an anonymous report?"). You may also choose to report gender-based violence and discrimination through other means, including by contacting the Institutional Equity Office (ieo@ou.edu, 405-325-3546) or police (911). Because the University of Oklahoma is committed to the safety of you and other students, I, as well as other faculty, Graduate Assistants, and Teaching Assistants, are mandatory reporters. This means that we are obligated to report gender-based violence that has been disclosed to us to the Institutional Equity Office. This includes disclosures that occur in: class discussion, writing assignments, discussion boards, emails and during Student/Office Hours. For more information, please visit the <u>Institutional</u> <u>Equity Office</u>.

Should you need modifications or adjustments to your course requirements because of documented pregnancy-related or childbirth-related issues, please contact your professor or the Accessibility and Disability Resource Center at 405/325-3852 as soon as possible. Also, see the Institutional Equity Office FAQ on Pregnant and Parenting Students' Rights for answers to commonly asked questions.

During an emergency, there are official university <u>procedures</u> that will maximize your safety.

Severe Weather: If you receive an OU Alert to seek refuge or hear a tornado siren that signals severe weather.

- 1. <u>Look</u> for severe weather refuge location maps located inside most OU buildings near the entrances
- 2. <u>Seek</u> refuge inside a building. Do not leave one building to seek shelter in another building that you deem safer. If outside, get into the nearest building.
- 3. <u>Go</u> to the building's severe weather refuge location. If you do not know where that is, go to the lowest level possible and seek refuge in an innermost room. Avoid outside doors and windows.
- 4. <u>Get in, Get Down, Cover Up</u>
- 5. <u>Wait</u> for official notice to resume normal activities.

Additional <u>Weather Safety Information</u> is available through the Department of Campus Safety.

If you receive an OU Alert to shelter-in-place due to an active shooter or armed intruder situation or you hear what you perceive to be gunshots: 1. *Avoid*: If you believe you can get out of the area WITHOUT encountering the armed individual, move quickly towards the nearest building exit, move away from the building, and call 911. 2. *Deny*: If you cannot flee, move to an area that can be locked or barricaded, turn off lights, silence devices, spread out, and formulate a plan of attack if the shooter enters the room. 3. *Defend*: As a last resort fight to defend yourself.

For more information, visit <u>OU's Emergency Preparedness site</u>. <u>Shots Fired on Campus Procedure – Video</u>

If you receive an OU Alert that there is danger inside or near the building, or the fire alarm inside the building activates: *1. LEAVE* the building. Do

not use the elevators. 2. KNOW at least two building exits 3. ASSIST those that may need help 4. PROCEED to the emergency assembly area 5 ONCE safely outside, NOTIFY first responders of anyone that may still be inside building due to mobility issues. 6. WAIT for official notice before attempting to re-enter the building. OU Fire Safety on Campus

If you are experiencing any mental health issues that are impacting your academic performance, counseling is available at the University Counseling Center (UCC). The Center is located on the second floor of the Goddard Health Center, at 620 Elm Rm. 201, Norman, OK 73019. To schedule an appointment call (405) 325-2911. For more information, please visit University Counseling Center.