Instructor:
Dr. Allison Wing
awing@fsu.edu
Office: 6081 EOAS Building
Office Hours: TBD, or by appointment

Lecture: Mondays and Wednesdays 1:20-2:35 PM, over Zoom

Prerequisites: Atmospheric Dynamics (MET 4301/5311 or equivalent), Atmospheric Physics I & II (MET 4420/5425, MET 4450/5451 or equivalent) with grades of "C" or better, or permission of the instructor

Course Description:
This course will cover shallow and deep atmospheric convection, considering both the local properties of individual clouds or convective systems and the ensemble properties of convection and its global implications. It will explore interactions between convection, the boundary layer, and larger-scale weather systems as well as the role that convection plays in climate. Topics to be covered include: Rayleigh-Benard convection and dry convective boundary layers, radiative-convective equilibrium, the stratocumulus-trade cumulus transition, deep precipitating convection, convective organization, and modeling of convection. This course is classified as a physical meteorology elective.

Learning Objectives: At the completion of this course, students will:

1. Gain a conceptual and quantitative understanding of convective flows and interactions between convection and the environment
2. Be able to use simple models, like radiative-convective equilibrium, to explain basic properties of climate
3. Develop critical reading skills of contemporary literature on convective processes

Resources: There is no required textbook, but you may find this book to be a helpful resource: Atmospheric Convection, by Kerry A. Emanuel. Oxford University Press, pp. 592, February 17, 1994. ISBN: 978-0195066302.

This review article is another good resource: Stevens, B. (2005): Atmospheric Moist Convection, *Annu. Rev. Earth Planet. Sci.*, 33, 605-643, doi:10.1146/annurev.earth.33.092203.122658.

Course Content:

1. Preliminaries & Dry Convection
    - Review of dry thermodynamics and buoyancy
    - Convection from local sources (plumes & thermals)
    - Rayleigh-Benard Convection
    - Dry convective boundary layers
2. Moist Convection
    - Review of moist thermodynamics and stability
    - Radiative-convective equilibrium
    - Stratocumulus convection
    - Shallow cumulus convection

    - Deep cumulus convection
    - Slantwise convection
3. Interaction with environment & large-scale flows
    - Quasi-equilibrium vs. triggered convection
    - Squall lines, mesoscale convective systems
    - Self-aggregation of deep convection
    - Organization of shallow convection
4. Modeling of convection
    - Cloud-resolving modeling
    - Cumulus parameterization

Grading Policy:

- Participation: 10%
- Homework assignments: 50%
- Mid-term Exam: 15%
- Presentation of paper from peer-reviewed literature related to convective processes: 25%

Grading Scheme:
Specific points-based schemes used to mark individual assignments will be discussed as appropriate at the time of assignment. Participation grades are based on attendance and discussion in class; all students must participate by asking/answering at least one question in each class. If a student completes this baseline level of participation, as well as attends every class, the student will receive a 95% (A) for their overall participation grade. Students may receive above a 95% by participating more. As an accommodation for COVID-related absences, students will be able to satsify participation by emailing their question for each class to the instructor.

- A- to A: Demonstrates a deep understanding of material. Exhibits a high level of insight and originality.
- B- to B+: Demonstrates a sound understanding of material and some level of insight and originality. Few errors.
- C- to C+: Demonstrates a sufficient understanding of material. Moderate errors. Little insight or originality.
- D- to D+: Demonstrates little understanding of material. Many errors. No insight or originality.
- F: Makes an insufficient attempt to complete required work. Demonstrates a serious lack of understanding of material.

The following grading standards will be used in this class:

Course Procedures:
Class will be held synchronously via Zoom during the scheduled meeting times. Lectures will be recorded and the recordings and notes will be made available via Canvas after class. However, students are still strongly encouraged to take their own notes during class. Students are encouraged but not required to have their video on during class.

Homework is to be submitted via Canvas by uploading a typed or scanned document of

Grade	Range	Grade	Range	Grade	Range
–	–	A	94% to 100%	A-	90% to 93%
B+	87% to 89%	B	84% to 86%	B-	80% to 83%
C+	77% to 79%	C	74% to 76%	C-	70% to 73%
D+	67% to 69%	D	64% to 66%	D-	60% to 63%
–	–	F	59% and below	–	–

the completed assignment. LaTeX is suggested for typsetting assignments, but is not required. You are encouraged to discuss solutions to homework assignments with your classmates, but you must write-up your solutions independently. Copying a classmate's solutions is a breach of the FSU Academic Honor Policy (see below).

Student Responsibilities: Students are expected to keep up with the class, engage with the course material, and submit assignments by due dates. Students are expected to be engaged and attentive during class, and *not* be viewing other material on their computers or cell phones. Students should listen quietly and respectfully with their microphones muted when not speaking, but are strongly encouraged to ask and answer questions! Questions may be asked during class via the chat feature on Zoom, by selecting "raise hand" in the participants window, or turning on your microphone and politely interrupting.

Students are expected to arrive on-time and attend every class meeting, unless pre-arranged with the instructor or excused in accordance with the University Attendance Policy (see below). To be successful in this course, students need to complete all required assignments. Excessive absences or missed assignments, whether due to illness or other reasons, will undermine a student's ability to successfully complete the class.

Policy for Late Assignments:
Assignments turned in after the stated deadline will not be accepted and will be assessed a score of 0 % unless either a) a prior arrangement was agreed upon between the instructor and student , or b) mitigating circumstances permitted an excused absence on the due date of the assignment (see below for University Attendance Policy). Communication is vital - students must immediately notify the instructor via email regarding illness or other extenuating circumstances *prior* to missing a deadline.

University Attendance Policy:
Excused absences include documented illness, deaths in the family and other documented crises, call to active military duty or jury duty, religious holy days, and official University activities. These absences will be accommodated in a way that does not arbitrarily penalize students who have a valid excuse. Consideration will also be given to students whose dependent children experience serious illness. Due to COVID-19, there will be flexibility with regards to the type of documentation needed for absences related to illness. A small number of absences due to illness will be excused without formal documentation, but immediate notification of the instructor via email *prior* to the absence is required and all missed work must be made up.

Academic Honor Policy:
The Florida State University Academic Honor Policy outlines the University's expectations

for the integrity of students' academic work, the procedures for resolving alleged violations of those expectations, and the rights and responsibilities of students and faculty members throughout the process. Students are responsible for reading the Academic Honor Policy and for living up to their pledge to ".... be honest and truthful and .... [to] strive for personal and institutional integrity at Florida State University." (Florida State University Academic Honor Policy, found at `http://fda.fsu.edu/Academics/Academic-Honor-Policy`.)

Free Tutoring from FSU:
On-campus tutoring and writing assistance is available for many courses at Florida State University. For more information, visit the Academic Center for Excellence (ACE) Tutoring Services' comprehensive list of on-campus tutoring options - see `http://ace.fsu.edu/tutoring` or contact `tutor@fsu.edu`. High-quality tutoring is available by appointment and on a walk-in basis. These services are offered by tutors trained to encourage the highest level of individual academic success while upholding personal academic integrity.

Americans with Disabilities Act:
Students with disabilities needing academic accommodation should:
(1) register with and provide documentation to the Office of Accessibility Services; and
(2) request a letter from the Office of Accessibility Services to be sent to the instructor indicating the need for accommodation and what type; and
(3) meet (in person, via phone, email, skype, zoom, etc...) with each instructor to whom a letter of accommodation was sent to review approved accommodations.

This syllabus and other class materials are available in alternative format upon request.

For the latest version of this statement and more information about services available to FSU students with disabilities, contact the:

Office of Accessibility Services
874 Traditions Way
108 Student Services Building
Florida State University
Tallahassee, FL 32306-4167
(850) 644-9566 (voice)
(850) 644-8504 (TDD)
oas@fsu.edu
`https://dsst.fsu.edu/oas/`

Syllabus Change Policy:
Except for changes that substantially affect implementation of the evaluation (grading) statement, this syllabus is a guide for the course and is subject to change with advance notice.