SYLLABUS

ATS 710 Geophysical Vortices Fall Semester 2017

Professor: Michael M. Bell
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Time and Location: MW 11:00-12:15 am in ATSW 121
Office Hours: WF 2:00-3:00 pm, or by appointment
First day of instruction 8/23/17, last day of instruction 12/6/17.

Student Outcomes: This is a graduate level course on geophysical vortices, with a focus on tropical cyclones. Students will obtain a fundamental understanding of synoptic scale and mesoscale aspects of tropical cyclogenesis, theory, intensity change, extratropical transition, and landfall processes. Students will become familiar with theoretical, observational, and modeling studies of tropical cyclones, with an in-depth examination of a relevant topic researched in a course project.

Topic Outline

1. Course Introduction and basics of tropical cyclones
2. Tropical cyclogenesis
3. Maximum Potential Intensity theory, observations, and modeling
4. Intensity Change
    a. Sawyer-Eliassen equation
    b. Boundary layer processes
    c. Vorticity dynamics
5. Impacts of vertical wind shear
6. Extratropical transition
7. Landfall processes, including storm surge and heavy rainfall
8. Research project presentations

Instructor may modify this schedule as needed to adjust the order in which material is presented, and some classes will be rescheduled.

Course procedures: The course will be based on research papers from the refereed literature. No textbook is required. Lectures will be given by the instructor, guest lecturers, and enrolled students. GitHub will be used to build a 'virtual textbook' from the literature. Students will need to obtain a free GitHub account. There will be no exams. Each student will prepare and deliver oral presentations on one or more journal articles, along with written summaries. Each student will submit a research proposal for a more in-depth study of one related topic, and a subset of the proposals will be selected for research teams to work together on a final project. Course evaluation will be based on class participation, presentations, journal summaries, research project proposal, and research project participation.

Statement on Academic Integrity

This course will adhere to the CSU Academic Integrity Policy as found in the General Catalog (http://www.catalog.colostate.edu/FrontPDF/1.6POLICIES1112f.pdf) and the Student Conduct Code (http://www.conflictresolution.colostate.edu/conduct-code). At a minimum, violations will result in a grading penalty in this course and a report to the Office of Conflict Resolution and Student Conduct Services.