Mesoscale Meteorology ATSC 3402 -001  
Department of Physical and Environmental Sciences  
Spring 2020

A. COURSE INFORMATION

Course number/section: ATSC 3402/001  
Class meeting time: TR 9:30-10:45  
Class location: EN400  
Course Website: https://bb9.tamucc.edu/

B. INSTRUCTOR INFORMATION

Instructor: Dr. Chuntao Liu  
Office location: NRC1109  
Office hours: MWF 9:00-12:00AM  
Telephone: 361-825-3845  
e-mail: Chuntao.liu@tamucc.edu  
Appointments: email to make appointments

C. COURSE DESCRIPTION

Catalog Course Description
This course focuses on introducing mesoscale weather systems including thunderstorms, squall lines and hurricanes, as well as the mechanisms of tornado and lighting. The methods of observing, analyzing, and predicting these severe weather systems with the interpretation of satellite and radar images will also be introduced in this class.

Extended Course Description
The course is open to a broad audience of undergraduate and graduate students in the College of Science and Engineering, who are interested in understanding the mechanism of severe weather and gain the basic knowledge of interpreting the weather radar and satellite images. Primary audience will be the undergraduate students in programs with background of math and physics, such as Environmental Sciences, and Marine Biology. The prerequisite is ESCI3403 or ATSC3403.

D. PREREQUISITES AND COREQUISITES

Prerequisites
ATSC3403 or ESCI3403  
Corequisites
ATSC3402-101 is required to be registered with this class

E. REQUIRED TEXTBOOK(S), READINGS AND SUPPLIES

Required Textbook(s)
No requirement
**Optional Textbook(s) or Other References**

Mesoscale Meteorology and forecasting -by Peter S. Ray, 1986
Mesoscale Meteorology in Midlatitudes –by Paul Markowski and Yvetter Richardson, 2010
Textbook website: [http://severewx.atmos.uiuc.edu/](http://severewx.atmos.uiuc.edu/)

**Supplies**

None.

**F. STUDENT LEARNING OUTCOMES AND ASSESSMENT**

Assessment is a process used by instructors to help improve learning. Assessment is essential for effective learning because it provides feedback to both students and instructors. A critical step in this process is making clear the course’s student learning outcomes that describe what students are expected to learn to be successful in the course. The student learning outcomes for this course are listed below. By collecting data and sharing it with students on how well they are accomplishing these learning outcomes students can more efficiently and effectively focus their learning efforts. This information can also help instructors identify challenging areas for students and adjust their teaching approach to facilitate learning.

By the end of this course, students should be able to:

1. Understand the mechanisms of the mesoscale weather systems, including super cells, squall lines, and hurricanes, as well as the physics behind tornados and lightning.
2. Understand the fundamental principle of weather radar remote sensing and how to interpret the weather radar and satellite images for severe weathers.
3. Communicate the research in a professional and effective manner

**G. INSTRUCTIONAL METHODS AND ACTIVITIES**

Traditional lectures via board demonstrations and power point presentations, classroom discussions, and student homework, reading, and projects. Homework will consist of assigned readings and critical analysis.

**H. MAJOR COURSE REQUIREMENTS AND GRADING**
<table>
<thead>
<tr>
<th>Assignment</th>
<th>Overall Percentage</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class Participation</td>
<td>5%</td>
<td></td>
</tr>
<tr>
<td>Lab</td>
<td>20%</td>
<td></td>
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<tr>
<td>Homework:</td>
<td>20%</td>
<td></td>
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<tr>
<td>Mid-term Exam:</td>
<td>25%</td>
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<tr>
<td>Final Exam:</td>
<td>30%</td>
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<tr>
<td>Total:</td>
<td>100%</td>
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<table>
<thead>
<tr>
<th>Class Average (X)</th>
<th>Grade</th>
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</thead>
<tbody>
<tr>
<td>X ≥ 90.0%</td>
<td>A – Excellent</td>
</tr>
<tr>
<td>89.9% ≤ X &lt; 90.0%</td>
<td>B – Good</td>
</tr>
<tr>
<td>80.0%</td>
<td></td>
</tr>
<tr>
<td>79.9% ≤ X &lt; 80.0%</td>
<td>C – Satisfactory</td>
</tr>
<tr>
<td>70.0%</td>
<td></td>
</tr>
<tr>
<td>69.9% ≤ X &lt; 70.0%</td>
<td>D – Passing</td>
</tr>
<tr>
<td>60.0%</td>
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<tr>
<td>X &lt; 60.0%</td>
<td>F – Failing</td>
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I. **COURSE CONTENT/SCHEDULE**

Course topics include historical review of severe weather and introduction of atmosphere, weather maps, weather radar and satellite remote sensing, and mechanisms of severe weathers, including thunderstorms, squall lines, hurricanes, tornados, lightning and aviation and mountain related severe weathers.

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
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<tbody>
<tr>
<td>1</td>
<td>Historical review of severe weather and introduction of atmosphere</td>
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<td>2</td>
<td>Introduction of meteorological measurements and weather maps</td>
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<td>3</td>
<td>Introduction of satellite remote sensing</td>
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<td>4</td>
<td>Principle of weather radar</td>
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<td>5</td>
<td>Convection and Single cell thunderstorms</td>
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<td>6</td>
<td>Multiple cells and squall lines</td>
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<tr>
<td>7</td>
<td>Super cells</td>
</tr>
<tr>
<td>8</td>
<td>Tornados</td>
</tr>
</tbody>
</table>
9 Hurricanes
10 Hail storms and diurnal cycles
11 Lightning
12 Aviation related hazard and downburst
13 Frontal systems and cyclones
14 Freezing precipitation and lake effect snow
15 Severe weathers related to mountains
Final Exam

Note: Changes in this course schedule may be necessary and will be announced to the class by the Instructor. The assignments and exams shown are directly related to the Student Learning Outcomes described in Section F.

J. COURSE POLICIES

Attendance/Tardiness
It is in the best interest of student’s to attend each class, because of the weight placed on the lectures in the homework and exams. Participation is essential to do well in the class, which includes in-class discussion and direct communication with the instructor and peers.

Discussions and student input are considered an important part of the class. Class exams cannot be retaken other than for an excused absence. Excused absences are limited to medical emergencies that can be certified in writing by a physician, participation in a TAMUCC sanctioned event or other similar circumstances justified in writing and specified in the TAMUCC graduate catalog for the ongoing academic year. Assignments are expected on time unless prior arrangements are made. Such prior arrangements will be granted only in exceptional circumstances as well. Without prior arrangement, the late homework has a 10% deduction if turned in prior to grading of other assignments and 20% if turned in after graded assignments are returned.

Extra Credit
Student may choose to complete a final project that may be counted as extra credit (10-20%) to the final grade.

Cell Phone Use
Not allowed.

Laptop Use
Laptop usage is encouraged during the class since there could be discussions of real time weather.

Food in Class
K. COLLEGE AND UNIVERSITY POLICIES

• Academic Integrity (University)
University students are expected to conduct themselves in accordance with the highest standards of academic honesty. Academic misconduct for which a student is subject to penalty includes all forms of cheating, such as illicit possession of examinations or examination materials, falsification, forgery, complicity or plagiarism. (Plagiarism is the presentation of the work of another as one’s own work.) In this class, academic misconduct or complicity in an act of academic misconduct on an assignment or test will result in a failing grade.

• Classroom/Professional Behavior
Texas A&M University-Corpus Christi, as an academic community, requires that each individual respect the needs of others to study and learn in a peaceful atmosphere. Under Article III of the Student Code of Conduct, classroom behavior that interferes with either (a) the instructor’s ability to conduct the class or (b) the ability of other students to profit from the instructional program may be considered a breach of the peace and is subject to disciplinary sanction outlined in article VII of the Student Code of Conduct. Students engaging in unacceptable behavior may be instructed to leave the classroom. This prohibition applies to all instructional forums, including classrooms, electronic classrooms, labs, discussion groups, field trips, etc.

• Statement of Civility
Texas A&M University-Corpus Christi has a diverse student population that represents the population of the state. Our goal is to provide you with a high quality educational experience that is free from repression. You are responsible for following the rules of the University, city, state and federal government. We expect that you will behave in a manner that is dignified, respectful and courteous to all people, regardless of sex, ethnic/racial origin, religious background, sexual orientation or disability. Behaviors that infringe on the rights of another individual will not be tolerated.

• Deadline for Dropping a Course with a Grade of W (University)
I hope that you never find it necessary to drop this or any other class. However, events can sometimes occur that make dropping a course necessary or wise. **Please consult with your academic advisor, the Financial Aid Office, and me, before you decide to drop this course.** Should dropping the course be the best course of action, you must initiate the process to drop the course by going to the Student Services Center and filling out a course drop form. Just stopping attendance and participation WILL NOT automatically result in your being dropped from the class. Please consult the Academic Calendar (http://www.tamucc.edu/academics/calendar/) for the last day to drop a course.

• Grade Appeals (College of Science and Engineering)
As stated in University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures, a student who believes that he or she has not been held to appropriate academic standards as outlined in the class syllabus, equitable evaluation procedures, or appropriate grading, may appeal the final grade given in the course. The burden of proof is upon the student to demonstrate the appropriateness of the appeal. A student with a complaint about a grade is encouraged to first discuss the matter with the instructor. For complete details, including the responsibilities of the parties involved in the process and the number of days allowed for completing the steps in the process, see University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures. These documents are accessible through the University Rules website at http://www.tamucc.edu/provost/university_rules/index.html, and the College of Science and Engineering Grade Appeals webpage at http://sci.tamucc.edu/students/GradeAppeal.html. For assistance and/or guidance in the grade appeal process, students may contact the chair or director of the appropriate department or school, the Office of the College of Science and Engineering Dean, or the Office of the Provost.

- **Disability Services**
  The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please call (361) 825-5816 or visit Disability Services in Corpus Christi Hall 116.

  If you are a returning veteran and are experiencing cognitive and/or physical access issues in the classroom or on campus, please contact the Disability Services office for assistance at (361) 825-5816.

  http://disabilityservices.tamucc.edu/

- **Statement of Academic Continuity**
  In the event of an unforeseen adverse event, such as a major hurricane and classes could not be held on the campus of Texas A&M University–Corpus Christi; this course would continue through the use of Blackboard and/or email. In addition, the syllabus and class activities may be modified to allow continuation of the course. Ideally, University facilities (i.e., emails, web sites, and Blackboard) will be operational within two days of the closing of the physical campus. However, students need to make certain that the course instructor has a primary and a secondary means of contacting each student.

### L. OTHER INFORMATION
- **Academic Advising**
The College of Science & Engineering requires that students meet with an Academic Advisor as soon as they are ready to declare a major. The Academic Advisor will set up a degree plan, which must be signed by the student, a faculty mentor, and the department chair. Meetings are by appointment only; advisors do not take walk-ins. Please call or stop by the Advising Center to check availability and schedule an appointment. The College’s Academic Advising Center is located in Center for Instruction 350 or can be reached at (361) 825-3928.

GENERAL DISCLAIMER
I reserve the right to modify the information, schedule, assignments, deadlines, and course policies in this syllabus if and when necessary. I will announce such changes in a timely manner during regularly scheduled lecture periods.