Physical Meteorology – ATSC 3305.001
Department of Physical and Environmental Sciences
Spring 2018

A. COURSE INFORMATION

Course number/section: ATSC 3305.001
Class meeting time: MW 11:00 AM - 12:15 PM
Class location: EN-400
Course Website: https://bb9.tamucc.edu

B. INSTRUCTOR INFORMATION

Instructor: Dr. Feiqin Xie
Office location: NRC 3507
Office hours: TWR 2:30-4:30 PM or by appointment
Telephone: 825-3229
e-mail: feiqin.xie@tamucc.edu
Appointments: Email or call for appointment

C. COURSE DESCRIPTION

Catalog Course Description
This course will cover the fundamentals of atmospheric physics including the atmospheric composition, kinetic theory of gases, moist processes, aerosol, solar and terrestrial radiation, scattering of electromagnetic radiation, radiative transfer, and planetary boundary layer.

Extended Course Description
None

D. PREREQUISITES AND COREQUISITES

Prerequisites
ATSC 2403 (Introduction to Meteorology) and PHYS 2426 (University Physics II), or instructor’s consent.

Corequisites
None

E. REQUIRED TEXTBOOK(S), READINGS AND SUPPLIES

Required Textbook(s)
Optional Textbook(s) or Other References


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.

The overall goal of this course is to provide students a foundation in physical meteorology that is suitable for professional employment and/or advanced study in atmospheric sciences.

By the end of this course, students should be able to:
1. Exhibit critical thinking when confronting new information;
2. Apply the mathematical and physical foundations of meteorology to solve problems using analytical and computational methods;
3. Explain moist processes related to cloud and precipitation formation;
4. Obtain a working knowledge of the transfer of shortwave and longwave radiation in the atmosphere;
5. Explain the basic physics of light scattering by small particles, and explain the reasons for the spectrum of colors observed in the sky;
6. Formulate basic understanding of atmospheric boundary layer structure and turbulence.

G. INSTRUCTIONAL METHODS AND ACTIVITIES
In class presentation and discussion.

H. MAJOR COURSE REQUIREMENTS AND GRADING
The final grade will come from: attendance and participation (10%), homework (20%), midterm (25%), term paper (20%), and final exam (25%). Letter grades will be assigned as follows: A = 90-100%, B = 80-89.99%, C = 70-79.99%, D = 60-69.99% F = 0-59.99%.
Term Paper: A paper related to a class topic in both hardcopy and electronic form (MS-WORD or PDF format) will be due on April 18. Paper should be between 1500 and 2000 words long, 1.5 lines spacing, 1 inch margins, 12 pt times new roman font, citing at least 4 peer reviewed papers using a consistent referencing format, 2 figures, and 1 table. A grading rubric (attached at the end of the document) will be used to evaluate the term paper.

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>% of FINAL GRADE</th>
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<tbody>
<tr>
<td>Exams (Mid-term / Final)</td>
<td>50% (25% / 25%)</td>
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<tr>
<td>Homework</td>
<td>20%</td>
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<tr>
<td>Papers + Presentations</td>
<td>20%</td>
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<tr>
<td>Attendance</td>
<td>10%</td>
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I. COURSE CONTENT/SCHEDULE

The outline of lecture topics and major due dates are listed below.

<table>
<thead>
<tr>
<th>WEEK</th>
<th>DATE</th>
<th>TOPIC</th>
<th>CHAPTERS</th>
<th>ASSIGNMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>01-17</td>
<td>Introduction</td>
<td>MS. 1</td>
<td></td>
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<tr>
<td>2</td>
<td>01-22</td>
<td>Atmospheric composition and structure</td>
<td>MS. 1</td>
<td>HW-01</td>
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<tr>
<td>3</td>
<td>01-29</td>
<td>Kinetic theory and transport</td>
<td>MS. 2, 3</td>
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<td>4</td>
<td>02-05</td>
<td>Moist processes</td>
<td>MS. 5, 6</td>
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<td>5</td>
<td>02-12</td>
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<td>6</td>
<td>02-19</td>
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<td>7</td>
<td>02-26</td>
<td>Paper Title Due</td>
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<td>8</td>
<td>03-07</td>
<td>Mid-term Exam</td>
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<td>EXAM-I</td>
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<tr>
<td>9</td>
<td>03-12/16</td>
<td>Spring Break</td>
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<tr>
<td>10</td>
<td>03-19</td>
<td>Atmospheric Aerosol</td>
<td>MS. 9</td>
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<td>11</td>
<td>03-26</td>
<td>Solar and terrestrial radiation</td>
<td>MS. 8</td>
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<tr>
<td>12</td>
<td>04-02</td>
<td>Radiative transfer and scattering</td>
<td>MS. 8</td>
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<tr>
<td>13</td>
<td>04-09</td>
<td></td>
<td></td>
<td>Term Paper Due</td>
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<tr>
<td>14</td>
<td>04-16</td>
<td>Planetary boundary layer</td>
<td>MS. 13</td>
<td>Proj. Slides Due</td>
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<td></td>
<td>04-18</td>
<td>Final review</td>
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<td>15</td>
<td>04-23</td>
<td>Project Presentation-II</td>
<td>Last Class</td>
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<td>04-25</td>
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<tr>
<td>16</td>
<td>05-02</td>
<td>Final Exam (11:00 AM)</td>
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<td>EXAM-II</td>
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</tbody>
</table>

3
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. References: MS.: Salby, M.L. (1996), Fundamentals of Atmospheric Physics, Academic Press.

J. COURSE POLICIES

Students are expected to attend all scheduled classes and to participate in class activities. Group discussions are encouraged. However, you are supposed to work out any assignments individually. Work handed in is assumed to be yours, unless specified to be a group project. Please note that university alcohol and drug policies are strictly enforced.

- **Attendance/Tardiness**
  Random attendance sheet will be handed out during the semester. The full attendance will earn 10% credit to the final grade.

- **Late Work and Make-up Exams**
  Assigned work is due by the stated deadlines. You may always turn in assignments early. Except for excused absences, the grade of late assignment will be reduced by up to 20% each day after the deadline. If you know in advance that you will have an excused absence when an assignment is due, you must turn in that assignment before its due date. You should turn in assignments that were missed because of an unexpected, excused absence as soon as possible.

  There will be **NO** make-up exams except in extremely rare cases in which some unforeseen crisis/emergency arises. If you know ahead of time that you have a conflict with the exam schedule, discuss this with me as soon as possible to make arrangements for the exam. Do not expect to arrange different exam schedules simply because it is more convenient.

- **Extra Credit**
  Limited extra credit opportunities will be available. Extra credit work must be submitted by the stated deadlines, which will be announced upon specific notice during the semester.

- **Cell Phone Use**
  Cellphones should be silenced. No phone conversations are allowed in class. Cell phone can be prudently used for crucial in-class communications, such as notetaking, or recording. Distraction, annoyance, or nuisance by the use of any device will be addressed immediately by the instructor and the student will have the option of discontinuing its use or exiting the classroom (resulting in a recorded absence).
• **Laptop Use**
  Student is welcomed to bring a laptop or other device to class to facilitate the learning experience (e.g., takes notes, research an issue, etc.). The use of laptops for other reasons is discouraged as it distracts the learning experience.

• **Food in Class and Lab**
  Students’ schedules may be hectic and may not allow time between classes for meals. If consuming food and drink in the lecture classroom please respect the facilities by cleaning up all spills immediately and removing all trash.

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.
## PAPER -- GRADING RUBRIC

<table>
<thead>
<tr>
<th>CRITERION/TRAIT</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
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<tbody>
<tr>
<td><strong>Written Communication –</strong></td>
<td><strong>Organization</strong></td>
<td><strong>Organization</strong></td>
<td><strong>Organization</strong></td>
<td><strong>Organization</strong></td>
<td><strong>Organization</strong></td>
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<tr>
<td>Score: ____</td>
<td>Writing is clearly organized. Each paragraph is clear and relates to others in a well-organized framework</td>
<td>Writing demonstrates sufficient organization with a clear thesis and supporting details.</td>
<td>Writing is rambling and unfocused. Major topic and supporting arguments are presented in a disorganized and unrelated way.</td>
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<td>Writing is rambling and unfocused. Major topic and supporting arguments are presented in a disorganized and unrelated way.</td>
</tr>
<tr>
<td><strong>Written Communication –</strong></td>
<td><strong>Language Use</strong></td>
<td><strong>Language Use</strong></td>
<td><strong>Language Use</strong></td>
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<td><strong>Language Use</strong></td>
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<tr>
<td>Score: ____</td>
<td>Writing is excellent. Word usage, spelling, grammar, and punctuation are excellent.</td>
<td>Writing is sufficient. Adequate use of wording, grammar, and punctuation. Errors are minimal</td>
<td>Writing is poor. Significant deficiencies in word use, grammar, punctuation, and/or presentation.</td>
<td>Some sources are cited correctly (in text and on reference page); a consistent citation system is not used or used for a minority of citations. Or, no reference page is present.</td>
<td>Some sources are cited correctly (in text and on reference page); a consistent citation system is not used or used for a minority of citations. Or, no reference page is present.</td>
</tr>
<tr>
<td><strong>References/citation system</strong></td>
<td>All sources are cited correctly and thoroughly (in text and on reference page); a citation system is used consistently and correctly.</td>
<td>All sources are cited, the majority cited correctly (in text and on reference page); a citation system is used correctly for majority of citations.</td>
<td>Paper is not 1500-2000 words, 1.5-spaced. Format harms the clarity of the paper. Poor execution of mechanics.</td>
<td>Paper is not 1500-2000 words, 1.5-spaced. Format harms the clarity of the paper. Poor execution of mechanics.</td>
<td>Paper is not 1500-2000 words, 1.5-spaced. Format harms the clarity of the paper. Poor execution of mechanics.</td>
</tr>
<tr>
<td><strong>Format/mechanics</strong></td>
<td>Paper is 1500-2000 words, 1.5-spaced with 1” margins. Format enhances the clarity of the paper.</td>
<td>Paper is 1500-2000 words, 1.5-spaced. Margins may be larger than 1”. Format has limited effect on clarity of the paper.</td>
<td>Paper is not 1500-2000 words, 1.5-spaced. Format harms the clarity of the paper. Poor execution of mechanics.</td>
<td>Paper is not 1500-2000 words, 1.5-spaced. Format harms the clarity of the paper. Poor execution of mechanics.</td>
<td>Paper is not 1500-2000 words, 1.5-spaced. Format harms the clarity of the paper. Poor execution of mechanics.</td>
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<tr>
<td><strong>Critical thinking, problem solving</strong></td>
<td>Problem is clearly identified. Concepts, assumptions, inferences, and conclusions are clearly and thoroughly expressed. Analysis is logical and thorough.</td>
<td>Problem is clearly identified. Concepts, assumptions, inferences, and conclusions are expressed clearly in most cases but are not expressed thoroughly. Analysis is mostly logical but may be absent or flawed in some places.</td>
<td>Problem is not clearly identified. Concepts, assumptions, inferences, and conclusions are unclear, may be absent or flawed logic may be present. Analysis is minimal or absent or the logic used in argument may not be discerned.</td>
<td>Problem is not clearly identified. Concepts, assumptions, inferences, and conclusions are unclear, may be absent or flawed logic may be present. Analysis is minimal or absent or the logic used in argument may not be discerned.</td>
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</tr>
<tr>
<td><strong>Use of course material</strong></td>
<td>All relevant course material is used. Specific information from readings and lectures is incorporated into analysis and critique.</td>
<td>Majority of relevant course material is used. General information from readings and lectures is incorporated into analysis and critique.</td>
<td>Minimal course material is used. Information from readings and lectures is not incorporated into analysis and critique.</td>
<td>Minimal course material is used. Information from readings and lectures is not incorporated into analysis and critique.</td>
<td>Minimal course material is used. Information from readings and lectures is not incorporated into analysis and critique.</td>
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<tr>
<td><strong>Use of graphs and tables</strong></td>
<td>Effective use of figures and tables with proper format and presentation</td>
<td>Effective use of figures/tables with improper format and/or presentation (e.g. captions missing)</td>
<td>Missing or ineffective use of figures/tables.</td>
<td>Missing or ineffective use of figures/tables.</td>
<td>Missing or ineffective use of figures/tables.</td>
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Total Points (%) = (Sum of points of each individual trait/35)*100