**OCG200G - Extreme Weather**
**Fall 2021**

Beaupre 105 TuTh 3:30-4:45 PM

Instructor: Prof. Tetsu Hara
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Course websites:
URI Brightspace website: brightspace.uri.edu

- At this site you can find all lecture outlines, handouts, homework, mail, etc.
- Please check the website regularly; updates and important announcements will be posted on the home page.
- Please use Brightspace for all communications (emails)

## 0. COVID-19

- As of August 12, the university policy mandates masking in classrooms regardless of vaccination status. Even if this policy changes before/during the semester, I intend to require all students to wear a mask in the classroom. If the requirement changes, it will be communicated through Brightspace. Students who do not comply may be reported through the Student Conduct process.
- Please do NOT attend a class if you do not feel well, or if you think you may have been in contact with someone infected. I have modified the grading method so that missing classes will not significantly affect your grade.

## I. Course Description

Severe and extreme weather has far-reaching influences on our lives with impacts spanning the individual, region, and globe. The course focuses on extreme weather phenomena, lessons learned from past events and challenges ahead to reduce disaster risk.

Course Goals:
Introduction to the observations, theories, and forecasts of weather phenomena with focus on extreme weather. Learn the vocabulary and specifics of weather, put these facts together to understand key weather principles and then apply those principles to decision making. Recognize the potential impacts of extreme weather events on local and global communities.

We will use case studies to examine:
How does extreme weather impact people across economic and national boundaries?
Extreme weather warnings, infrastructure requirements and resiliency.

Where does government responsibility end and personal responsibility begin.
How has the weather changed the course of history, and what is the effect of climate change on extreme weather?
How is risk communicated?

## II. Learning Outcomes

A1 – STEM

- Differentiate between weather and climate.
- Recognize necessary ingredients for a severe weather system to develop.
- Question whether a severe weather system is an extreme event.
- Collect information to characterize, expected and extreme weather, climate, at a particular location.
- Interpret weather maps to assess potential for severe weather.

C2 – Global Responsibilities

- Global Identity—Global Self-Awareness
  - Characterize climate at an international location and consider how it shapes daily living.
- Global Communication – Globally-Aware Interaction
  - Assess differences and commonalities in weather around the globe and use weather as a communication 'ice-breaker.'
- Global Impact – Perspective Taking
  - Construct a first-person narrative of an extreme event.

## III. Required Text

Texts:

*Severe and Hazardous Weather An Introduction to High Impact Meteorology*
Robert Rauber, John Walsh and Donna Charlevoix, Kendall Hunt, Fifth Edition, 2017.

Text can be obtained directly from the publisher, Amazon, Barnes and Noble, URI bookstore:
To purchase: https://he.kendallhunt.com/rauber/

## IV. Textbook Rationale

We have chosen to use the Severe and Hazardous Weather text. We reviewed many books and found that modern meteorology textbooks all contain essentially the same content. *Severe and Hazardous Weather* stood out amongst the crowd for several reasons. First, the focus on extreme weather while maintaining a vigorous approach to fundamental processes immediately engages your natural curiosity. Second, the complex scientific concepts are presented in an accessible language to students of all backgrounds and are backed up with exceptional graphics. Third, the book emphasizes conceptual understanding rather than the memorization of technical vocabulary. Key words and concepts are clearly identified in the front of each chapter and called out within the body of the text. Self-study review questions are found at the end of each section and again at the end of each chapter.

Additional Readings:
The textbook will be used as a reference toward understanding the basic principles and vocabulary of weather. Additional readings may be provided and available on the Brightspace

course site. We will make use of emerging studies relating extreme events in the social context from sources such as the journal *Weather, Climate and Society* as well as reports from global news sources and international agencies such as the World Meteorological Organization.

**V. Class Format**

Each week there will be two 75-minute lectures and in-class exercises. The pdf files of lectures will be put on the Brightspace class site prior to or right after each class. These pdf documents are not a complete record of what goes on in class and viewing them on your own time is not an adequate substitute for attending class.

**VI. Grades**

Weather in the News Reports 25%
In-class Weather Exercises 25%
In-class Quizzes 35%
Final Exam 15%

A = 100-93%; A- = 92-90%
B+ = 89-88%; B = 87-83%; B- = 82-80%
C+ = 79-78%; C = 77-73%; C- = 72-70%
D = 69-60%
F (don't go there) = Below 60%.

***Weather in the News Reports:*** You will be expected to report on a recent 'weather news event'. We will provide a 'model' of the report before each assignment is due. The point of this exercise is to examine how weather impacts our world.

***Late Assignments:*** Students will not receive credit for late assignments.

***In-class Weather Exercises:*** Many, if not most, of the classes will have an in-class exercise that will be completed in class.

***Late Assignments:*** Students will not receive credit for late assignments. We will drop four in-class exercises from the final in-class exercises grade.

***In-class Quizzes (5 total):*** Cover material discussed in previous lectures, as well as, readings assigned in preparation for those days' activities. Expect them to take 10-20 minutes to complete.

***Missed quizzes:*** We will drop two lowest quiz scores from the total quiz grade. Student who miss a quiz without an approved absence will not receive credit for the quiz. Approved absences must be discussed, written and signed off by an instructor.

**VII. Expectation of Students**

***Attend*** – students are expected to attend each class period. For URI's rules and regulations regarding student grades, examinations and absences see Sections 8.51.11 – 8.51.14 of the University Manual (web.uri.edu/manual/chapter-8/chapter-8- 4/).

***Learning is Not a Spectator Sport*** - you will do well in this course if you keep up with reading assignments, attend lectures, and exert initiative in finding answers to questions you may have using the sources available to you (library, WWW, T.A., instructor, etc.). Keeping up means

reading the assigned chapters before class, and again after class. As future movers and shakers in a rapidly changing world, no matter what your profession, we want you to learn and think about climate and extreme weather and how it may impact your life, not just memorize facts to be forgotten by next semester. This is our goal, and we believe that with your effort, diligence and cooperation it is fully achievable.

***Technology: Tablets, Laptops, Smartphones, Cell Phones, Texting and Such*** – Please bring a web browser enabled "device" to class, since we will make use of it for exercises, quizzes, etc. BUT turn the ringer/sound off upon entering the classroom. Absolutely no texting or telephone calls during class. Since some exercises/quizzes require reading maps and charts, tablets or laptops may be preferable to phones. If you do not have a suitable device and need help, please let us know.

***Emergency Notification System.*** We understand there may be weather related emergency notices and other University broadcast emergency messages. These are allowed. You can manage URI Emergency Notifications through the alert system (web.uri.edu/emergency/alert).

***Academic Honesty*** – read the *Student Handbook, specifically Chapter 1* (web.uri.edu/studentconduct/university-student-handbook/) excerpted below on student responsibility! Here is our responsibility, *"Instructors have the responsibility of insuring that students prepare assignments with academic integrity. Instructors do all that is feasible to prevent plagiarism in term papers or other written work. Instructors have the explicit duty to take action in cases of cheating or plagiarism. The instructor has the right to fail a student on the assignment on which the instructor has determined that a student has cheated."*

***Parent(s)*** – Per federal law (https://en.wikipedia.org/wiki/Family_Educational_Rights_and_Privacy_Act) if you are 18 or older, we cannot discuss your academic performance with your parents or any outside party without your written consent (web.uri.edu/enrollment/third-party-access/).

***Academic Enhancement*** – Success in the course requires that you keep pace with the work, work to understand key concepts and study effectively. The Academic Enhancement Center (www.uri.edu/aec/) is a great place to study and review basic material. At the AEC you can work alone or in groups, and tutors and professional learning specialists are available to help you learn, manage your time and study well. Call the center for complete information at 874-2367 or stop by offices on the 4$^{th}$ floor of Roosevelt Hall.

**VIII. Disability Statement:**

Any student with a documented disability is welcome to contact the instructors as early in the semester as possible so that we may arrange reasonable accommodations. As part of this process, please be in touch with the Disability Services for Students Office at 302 Memorial Union, Phone 401-874-2098 (web.uri.edu/disability/).

Tentative Schedule (as of Aug 26, subject to change)

| Fall 2021 | Topic | Reading Assignments | Weather in News | Quiz |
|---|---|---|---|---|
| Thurs Sep 9 | Introduction | | | |
| Tues Sep 14 | Properties of the atmosphere | RWC Ch. 1 pp. 1-9 | | |
| Thurs Sep 16 | Composition and structure of the atmosphere | RWC Ch. 1 pp. 10-18 | | |
| Tues Sep 21 | Weather observations | RWC Ch. 2 pp. 21-42 | National | |
| Thurs Sep 23 | Weather maps and prediction | RWC Ch. 3 pp. 45-56 Ch. 4 pp. 59-69 | | |
| Tues Sep 28 | Atmospheric forces - 1 | RWC Ch. 7 pp. 131-147 | | Quiz |
| Thurs Sep 30 | "RI STORMTOOLS & the RI CRMC Coastal Hazard Application process" Lecture by Teresa Crean, URI Coastal Resources Center | | | |
| Tues Oct 5 | Atmospheric forces - 2 | RWC Ch. 7 pp. 131-147 | | |
| Thurs Oct 7 | Global Climate | RWC Ch. 5 pp. 81-89 | | |
| Tues Oct 12 | Atmospheric Circulation | | | |
| Thurs Oct 14 | Hurricanes | RWC Ch. 24 pp. 480-508 | | Quiz |
| Tues Oct 19 | "Stimulating transformational thinking for coastal resilience" Lecture by Rosemarie Fusco and Kyle McElroy, URI Department of Marine Affairs | | | |
| Thurs Oct 21 | Hurricane Forecasting | RWC Ch. 24 pp. 511-514 | International | |
| Tues Oct 26 | Hurricane Hazards and Risks | RWC Ch. 24 pp. 508-511 | | |
| Thurs Oct 28 | Atmospheric Stability | RWC Ch. 6 pp. 111-125 | | Quiz |
| Tues Nov 2 | "Catastrophe risk modeling" Lecture by Dr. Richard Yablonsky, AIRWorldwide Inc. | | | |
| Thurs Nov 4 | Thunderstorms | RWC Ch. 18 pp. 338-361 | | |
| Tues Nov 9 | Tornados | RWC Ch. 19 pp. 368-395 | | |
| Wed Nov 10 | "Real time storm surge prediction along RI coast during Henri" Lecture by Dr. Isaac Ginis, URI Graduate School of Oceanography | | | |
| Tue Nov 16 | Extratropical Storms | RWC Ch. 8 pp. 151-159 | | Quiz |
| Thurs Nov 18 | Nor'easters and Hazards | RWC Ch. 11 pp. 209-223 | Climate related | |
| Tues Nov 23 | Tutorial Session | | | |
| Tues Nov 30 | "Climate trend in Southern New England and its impact on river flooding" Lecture by Dr. David Vallee, NOAA National Weather Service, Boston | | | |
| Thurs Dec 2 | Monsoons | RWC Ch. 25 pp. 520- 523 | | |
| Tues Dec 7 | Climate Change | RWC Ch. 5 89-107 | | Quiz |
| Thurs Dec 9 | Climate Change and Extreme Weather | RWC Ch.11 pp. 225-226, Ch. 24 pp. 514-515, Ch. 25 pp. 544-545, Ch. 26 pp. 572-573, Ch. 27 595-596 | | |
| Thurs Dec 16 | Final Exam 6:30-8:30 p.m. | | | |

RWC – Rauber, R. E., J. E. Walsh and D. J. Charlevoix, [2017], *Severe and Hazardous Weather: An Introduction to High Impact Meteorology, 5th Ed*., Kendall-Hunt, Dubuque.