

# PHYSICAL OCEANOGRAPHY

## ATMS-355

### Spring 2024

#### Course Description:

An examination of the world's oceans from a physical perspective, with a particular focus on how oceans interact with the atmosphere. Topics include ocean structure, observation techniques, energy budget, surface and deep-water currents, Ekman theory, coastal processes and tides, and wave theory.

**Class Meetings:** MW 3:30–4:45 p.m. in RRO 238

**Prerequisites:** MATH-167 and ATMS-103 or  
ENVR-130

**Credit hours:** 3

#### Professor

Dr. Caitlin Crossett

**Office:** RRO 251

**Phone:** 828.250.3888

**Email:** [ccrosset@unca.edu](mailto:ccrosset@unca.edu)

**Office Hours:** M and Th: 10–11 a.m.

W: 1–2 p.m. or by appointment

#### GENERAL INFORMATION

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**Suggested Text:** Pinet, P. R., 2021: *Invitation to Oceanography*, 8<sup>th</sup> ed. Jones & Bartlett Learning, ISBN: 9781284164695 and Stewart, R. H. *Introduction to Physical Oceanography*, 2008 (PDF of book available on Moodle).

**Webpage:** The course webpage (Moodle) is referenced throughout the course and students are encouraged to access it regularly. Lecture slides, announcements, assignments, and sources of additional information will be made available on a regular basis.

Visit <http://www.atms.unca.edu/slos.shtml> for a list of the student learning outcomes for the Department of Atmospheric Sciences.

#### ASSIGNMENTS

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**Homework:** Homework sets will be assigned throughout the semester. These questions will be related to material discussed in class but may require you to solve a problem not directly addressed in class. You are encouraged to work with other students on homework, but all work should be your own and be written in your own words. Partial credit will be given, but all steps to the solution must be shown.

**Choose your own Adventure:** As this class is multi-disciplinary and there are likely students taking it from several academic backgrounds, choose your own adventure assignments (CA) will allow each of you to go more in depth about a topic of interest to you. Since I cannot cover every disciplinary connection it is my hope that you will use these assignments to connect course material to your own interests/ major. There will be nine opportunities to complete a CA assignment, but you are only required to complete four. More information will be provided on a separate handout.

**Exams:** Two exams, a midterm and a final, will be given in this course. Each exam will only cover material from before the previous exam (i.e., not cumulative). Although exams are not cumulative, many topics in this course build upon each other, so reviewing course material throughout the semester will be beneficial to you in this course. You are required to take the exams during the scheduled time unless other accommodations (i.e., University sponsored events, religious observances) have been cleared through me at least 48 hours before the exam. **No make-up exams will be given.**

| Course Work               | % of Grade |
|---------------------------|------------|
| Homework                  | 45%        |
| Choose your own Adventure | 15%        |
| Midterm Exam              | 20%        |
| Final Exam                | 20%        |

|    |           |    |           |
|----|-----------|----|-----------|
| A  | 92–100    | C  | 72.0–77.9 |
| A- | 90.0–91.9 | C- | 70.0–71.9 |
| B+ | 88.0–89.9 | D+ | 68.0–69.9 |
| B  | 82.0–87.9 | D  | 60.0–67.9 |
| B- | 80.0–81.9 | F  | < 60.0    |
| C+ | 78.0–79.9 |    |           |

## EXPECTATIONS/ COURSE POLICIES

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**Late Work:** I will accept late work for a 10% per day late penalty. No exams or quizzes will be given after the day they have been assigned in class (unless arrangements have been made with me). **LIFE TOKEN:** You will be allowed one 48-hour extension on one outside of class assignment (i.e., not a quiz, exam, or the final project) for no penalty. You must clear this extension with me no less than 24-hours before the due date.

**Academic Honesty:** Any act of plagiarism, cheating, or use of unauthorized material or assistance is academic dishonesty. A person who knowingly assists another in cheating is likewise guilty of cheating. It is up to my assessment of the gravity of the offense, that a student may be punished by a failing grade or a grade of zero for the assignment or test, or a failing grade in the course. I expect that you will exercise integrity in all quizzes, exams, and written assignments. Please email me or come in during office hours if you have additional questions or need clarification on any point.

**Attendance:** There is no attendance policy for this course, but your success in this course is undoubtedly tied to attending lectures regularly and keeping up with course content. Please come to class on time. Each class will start and end on time. If you need to arrive late, be respectful of others when you enter the classroom and find a seat. If you must leave early, please let me know before class and leave as quietly as possible so as not to disturb the class.

**Technology Use:** You may use laptops or tablets during class to take notes, but you may not use them for watching TV, doing work for other classes, or anything else not related to course discussion. I reserve the right to change this policy should distractions become an issue. If you have accommodations through the Office of Academic Accessibility ([accessibility.unca.edu](http://accessibility.unca.edu)) for electronics use during class, please come talk to me.

**Artificial Intelligence Tools Policy:** Using an AI-content generator such as ChatGPT to complete assignments without proper attribution violates academic integrity. By submitting assignments in this

class, you pledge to affirm that they are your own work and you attribute use of any tools and sources (guides to citing AI tools can be found [here](#)). Approved uses of ChatGPT are limited to: Brainstorming ideas, fine tuning research questions, assistance with coding (i.e., finding bugs), and locating supporting information such as journal articles and web pages. If you are unsure if a specific use of ChatGPT is approved, please email, or come talk to me.

**Communication:** I will primarily contact you about course information through email or our course website (Moodle) so please get in the habit of checking both every day! Therefore, email is also the best way to reach me with any questions/comments/concerns ([ccrosset@unca.edu](mailto:ccrosset@unca.edu)). I will monitor email from 8a.m.–5p.m. during the work week and intermittently outside of these hours and during the weekend. Please allow 24 hours for me to reply to your email and please make sure you've consulted the syllabus and our course website before asking a question whose answer might be on either.

**Respectful Classroom Environment:** It is expected that you will be respectful of other students, the instructor, and any guest presenters while in class. Just as you expect others to actively listen to your diverse set of thoughts and perspectives, I ask that you do the same. Any disrespectful or disruptive behavior will not be tolerated, and you will be asked to leave class. If something is shared in class (by anyone, including myself) that makes you feel uncomfortable, please let me know.

## UNIVERSITY RESOURCES

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**Accessibility:** UNC-Asheville values the diversity of our student body as a strength and a critical component of our dynamic community. Students with disabilities or temporary injuries/conditions may require accommodations due to barriers in the structure of facilities, course design, technology used for curricular purposes, or other campus resources. Students who experience a barrier to full access to this class should let the professor know, and/or make an appointment to meet with the Office of Academic Accessibility as soon as possible. To make an appointment, call 828.232.5050 or email [academicaccess@unca.edu](mailto:academicaccess@unca.edu). Learn more about the process of registering, and the services available through the Office of Academic Accessibility here: [accessibility.unca.edu](http://accessibility.unca.edu)

**Mental Health Support:** As a student, you may experience a range of challenges that can interfere with learning, such as stressful life events, experiences of anxiety and/or depression, self-harm, substance use, and/or unusual difficulty with ordinary life activities. The increased stress of school can also make existing mental health struggles more difficult to manage. Support is available and treatment can help. Learn more about the confidential mental health services UNC Asheville provides to support student success at <https://www.unca.edu/life/health-counseling/>. The Health and Counseling Center is located at 118 W.T. Weaver Boulevard. Appointments can be made by calling 828-251-6520. A UNC Asheville counselor on call is available after 5 p.m. and on weekends; the counselor on call can be accessed by calling the UNCA Campus Police dispatcher at 828-251-6710. Additionally available after hours and on weekends, call the Bulldog Health Link at 1-888-267-3675, where you can get immediate support for mental health, medical consultation, concern for a friend, and/or community resources. In case of an emergency, you can also call RHA's Mental Health Mobile Crisis Unit at 1-888-573-1006.

**COURSE SCHEDULE (subject to change) – ATMS 355 – Spring 2024**

| Week   | Date   | Topic                                    | Reading                      | Assignment |
|--------|--------|------------------------------------------|------------------------------|------------|
| 1      | 15-Jan | MLK Jr. Holiday - NO Class               |                              |            |
|        | 17-Jan | Introduction to Oceanography             | PP Ch. 1-2                   |            |
| 2      | 22-Jan | The Origin of Ocean Basins               | PP Ch. 3; RS<br>Ch. 3        |            |
|        | 24-Jan | The Origin of Ocean Basins               |                              |            |
| 3      | 29-Jan | Prof. Crossett at AMS Meeting - NO Class |                              |            |
|        | 31-Jan | Prof. Crossett at AMS Meeting - NO Class |                              |            |
| 4      | 5-Feb  | The Properties of Seawater               | PP Ch. 5; RS<br>Ch. 6        | CA         |
|        | 7-Feb  | The Properties of Seawater               |                              | HW1        |
| 5      | 12-Feb | The Properties of Seawater               |                              |            |
|        | 14-Feb | Wind and Ocean Circulation               | PP Ch. 6; RS<br>Ch. 9-11, 13 | CA         |
| 6      | 19-Feb | Wind and Ocean Circulation               |                              |            |
|        | 21-Feb | Wind and Ocean Circulation               |                              | HW2        |
| 7      | 26-Feb | Review Session                           |                              |            |
|        | 28-Feb | Exam #1                                  |                              |            |
| 8      | 4-Mar  | Waves in the Ocean                       | PP Ch. 7; RS<br>Ch. 16       | CA         |
|        | 6-Mar  | Waves in the Ocean                       |                              |            |
| 9      | 11-Mar | Spring Break - NO Class                  |                              |            |
|        | 13-Mar | Spring Break - NO Class                  |                              |            |
| 10     | 18-Mar | Waves in the Ocean                       |                              |            |
|        | 20-Mar | Tides                                    | PP Ch. 8; RS<br>Ch. 17       | CA         |
| 11     | 25-Mar | Tides                                    |                              |            |
|        | 27-Mar | Tides                                    |                              | HW3        |
| 12     | 1-Apr  | Atmosphere-Ocean Interactions            | RS Ch. 5                     | CA         |
|        | 3-Apr  | Atmosphere-Ocean Interactions            |                              |            |
| 13     | 8-Apr  | Atmosphere-Ocean Interactions            |                              |            |
|        | 10-Apr | Light and Sound in Seawater              |                              | CA         |
| 14     | 15-Apr | Light and Sound in Seawater              |                              | HW4        |
|        | 17-Apr | Shoreline Processes                      | PP Ch. 11; RS<br>Ch. 17      | CA         |
| 15     | 22-Apr | Global Climate Change & Human Influence  | PP Ch. 15-16                 | CA         |
|        | 24-Apr | Global Climate Change & Human Influence  |                              |            |
| 16     | 29-Apr | Review Session                           |                              | CA         |
| Friday | 3-May  | Exam #2: 3:00 - 5:30p.m.                 |                              |            |