



Learning Outcomes

Objectives of AOSC432 are to

- Formulate a system of geophysical fluid motion from basic principles of physics;
- Learn primary dynamical processes that are essential to large-scale circulations of the atmosphere and ocean.

After successfully completing AOSC432, you will be able to:

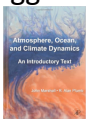
- Demonstrate how basic principles of physics leads to a system of geophysical fluid motion;
- Identify the key balance relationships in the horizontal and vertical directions for the large-scale motion of geophysical flows using basic mathematical techniques as the diagnostic tools,
- Investigate how the balanced elements dominate the dynamics and interact with the unbalanced elements.
- Diagnose essential processes in the large-scale atmospheric and oceanic circulations.

Resources

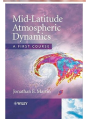
Course website: http://aosc.umd.edu/~ide/index_teaching_aosc432.php

Textbooks: (None is required)

- Suggested



Marshall & Plumb
“Atmosphere, Ocean, and Climate Dynamics”
Academic Press

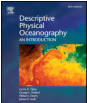


Martin
“Mid-Latitude Atmospheric Dynamics”
Wiley

- Additional



Wallace & Hobbs
“Atmospheric Science, Introductory Survey”
Academic Press



Talley, Picard, Emery, & Swift
“Descriptive Physical Oceanography”
Elsevier



Vallis (Note: very advanced)
“Atmospheric and Oceanic Fluid Dynamics”
Cambridge

Professor Kayo Ide

ide@umd.edu

Class Meets

Tuesdays & Thursdays

9:30am – 10:45am

ATL #2416

Office Hours

Tue 11am-12pm

ATL #3403

Teaching Assistant:

Emily Blumenauer

emblum5 @ gmail

Prerequisites

AOSC431

MATH246 (co-requisite)

Course Communication

You are welcome to ask questions during class meetings and office hour.

Campus Policies

It is our shared responsibility to know and abide by the University of Maryland's policies that relate to all courses, which include topics like:

- Academic integrity
- Student and instructor conduct
- Accessibility and accommodations
- Attendance and excused absences
- Grades and appeals
- Copyright and intellectual property

Please visit <http://www.ugst.umd.edu/courserelatedpolicies.html> for the Office of Undergraduate Studies' full list of campus-wide policies and follow up with me if you have questions.

Get some help!

Taking personal responsibility for your own learning means acknowledging when your performance does not match your goals and doing something about it. I hope you will come talk to me so that I can help you find the right approach to success in this course, and I encourage you to visit tutoring.umd.edu to learn more about the wide range of campus resources available to you. In particular, everyone can use some help sharpen their communication skills (and improving their grade) by visiting ter.ps/writing and schedule an appointment with the campus Writing Center. You should also know there are a wide range of resources to support you with whatever you might need (see go.umd.edu/assistance), and if you just need someone to talk to, visit counseling.umd.edu or [one of the many other resources on campus](#).

Most services free because you have already paid for it, and everyone needs help... all you have to do is ask for it.

Names/Pronouns and Self Identifications

The University of Maryland recognizes the importance of a diverse student body, and we are committed to fostering inclusive and equitable classroom environments. I invite you, if you wish, to tell us how you want to be referred to both in terms of your name and your pronouns (he/him, she/her, they/them, etc.). The pronouns someone indicates are not necessarily indicative of their gender identity. Visit trans.umd.edu to learn more.

Additionally, how you identify in terms of your gender, race, class, sexuality, religion, and dis/ability, among all aspects of your identity, is your choice whether to disclose (e.g., should it come up in classroom conversation about our experiences and perspectives) and should be self-identified, not presumed or imposed. I will do my best to address and refer to all students accordingly, and I ask you to do the same for all of your fellow Terps.

Course-Specific Policies

- Class attendance facilitates learning in a variety of ways and is strongly encouraged.
 - Attendance will be checked at the beginning of each class meeting.
 - If you miss class because of sickness, family sickness and such, please make a reasonable effort to review the material for the lecture that was missed.
- No computers, phones or tablet devices are permitted during any of in-class activities unless special permission is granted by the instructor for each occasion or when required for ADS accommodations.
 - For information about the science behind the policy watch: youtu.be/WwPaw3Fx5Hk

- If you are obviously using these devices: i) I will ask you to put away; ii) if you won't stop, I will ask you to leave and class will stop until you stop; and iii) your grade will get the reduction of 2% for (i) and 5% of (ii) per occurrence.
- If you cannot make the class activities from some official reasons (e.g., attending an AMS-related activity in support of UMD AOSC), you should inform me at least one week in advance.
- If you are ill and cannot make the exams/quizzes or submit the homework sets in time
 - From an official reason (e.g., representing UMD AOSC at the AMS meeting): The student must provide an official letter/paperwork and get approval by the instructor in one week advance for absence or lateness from official reasons,
 - From an illness: First and foremost, please take care and get well. To make arrangement for the missed activities, the student must obtain a note from a doctor or from the health center documenting your illness with the dates clearly specified. Notes from the parents, student himself/herself, or a friend will not be accepted. The student should also email the instructor as soon as possible.
- Quizzes will take place at the beginning of the class meeting. If you come late, you will not be able to participate.
- Elevator-pitch presentation is voluntary, counting 5% towards the final grades; 0% if you opt out.
- Homework is due by the end of the class meeting on the submission date. No late homework is accepted unless
 - You have obtained a written approval by the instructor prior to the submission date.
 - You are ill on the submission date and obtained a properly qualified note as above.
 - Unless approved with the instructor otherwise in advance, the weight reduction will be 70% if submitted by 5pm on the date, or 50% if submitted by 5pm on the next day.
- All exams are closed books/notes.

Subject Contents

I	Fundamentals	
	1	Introduction
	2	Background: Geophysical Fluids on Earth
	3	Review: Mathematical Concepts and Techniques
II	Geophysical Fluid Dynamics	
	4	System of Fluid Motion
	5	System of Geophysical Fluid Motion
	6	Balance I: Basics
	7	Balance II: Diagnostics in Isobaric Coordinate
	8	Vorticity
III	Large-Scale Circulations	
	9	General Circulation of Atmosphere
	10	General Circulation of Ocean

Activities

Class meetings

- Primary course activity will consist of white-board lectures accompanied with some illustration slides.
- Active participation is highly encouraged, and questions are always welcome.

Weekly Quizzes

- Primary objective is to help you understand specific topics better while providing formative assessments as the class will advance.
- On a weekly basis,
 - During Tuesday class meeting, topics of the weekly quizzes will be discussed.
 - At the beginning of Thursday class meeting, a brief (~5min) written quizzes will be given.

Elevator-pitch (30sec) presentation

- Primary objective is to help you actively engage and highly motivated.
- Logistic: One presentation per student
 - Topics and date of the presentations will be assigned randomly to individual in late February.
 - In-class presentations will take place starting late March.

Homework

- Five homework sets during the semester are planned to be given.
- All homework set will have due on Thursdays by the end of the class.
- No late homework will be accepted without prior agreement with the instructor.

Exams

- Mid-terms: two during the class, with the target dates (to be confirmed)
 - March 12, Thursday or March 24, Tuesday
 - April 14, Tuesday or April 16, Thursday
- Final: May 15, Friday, 8-10am (according to UMD final exam schedule)

Grades

Grades are not given but earned. Your grade will be determined by your performance on the learning assessments and will be assigned individually and fairly.

Weights for class activities

Activity	Weight towards the final grading
Weekly quizzes	25%
Elevator-pitch presentation	5% (or 0% if a student opts out)
Homework	20%
Midterm exams	30% (=15%x2)
Final exam	20%

Final grading criteria

Final grade	Total %
A	[85, 100]
B	[75, 85)
C	[60, 75)
D	[0, 60)