

Instructor Information

**Name**

Shawn Milrad

Email

milrads@erau.edu

Phone

386-226-7392

Student Hours/Office Hours

- **Student Hours/Office Hours**
 - **MWF: 2-4 pm**
 - **TuTh: Noon-5 pm**
 - **By appointment**

For COVID-19 reasons, if you do wish to meet in my office, I politely request that you wear a face covering. I'm also more than happy to meet with you in the Weather Lab, outside at a picnic table, or virtually via Zoom. Just let me know!

You may also contact me anytime via MS Teams. Write me a message and I will get back to you as soon as I can.

Office Location

COA 331

Instructor Page

Forecast links: <http://www.shawnmilrad.com/forecast>

Additional Info

Synoptic charts: <https://wx.erau.edu/milradsyn.php>



Synoptic Analysis DB-WX 378

Section(s): 01DB

Daytona/Prescott 2022 Spring

Catalog Course Description

Subjective analysis techniques of synoptic motions. Mid-latitude cyclones; jet stream dynamics; baroclinicity and vorticity advection; diagnoses of large-scale vertical ascent; air masses and fronts; cyclogenesis; fronts; three dimensional structure of baroclinic and barotropic systems; diagnoses of precipitation types; polar lows.

Course Information

Academic Term: Daytona/Prescott 2022 Spring

Term Dates: Jan 12, 2022 - May 5, 2022

Credit Hours: 3

Mode of Delivery: In Person

Class Meetings: 01:00 PM - 01:50 PM Monday,Wednesday,Friday

Location: College of Aviation 351

Additional Course Description

Course Objectives

- Produce regular forecasts for the ERAU campus and various U.S. points.
- Gain experience by completing oral and written forecast discussions on a regular basis.
- Introduce and regularly utilize model and human forecast tools, techniques, and products.
- Be able to manually analyze synoptic weather charts, and identify key large-scale features (e.g., jet streaks, troughs, fronts) from these charts.
- Learn quantitative and qualitative synoptic meteorology concepts and apply them to analysis and forecasting of large-scale weather systems.

Course Format

- This is a **hands-on weather forecasting and discussion course**. You will be forecasting and giving forecast discussions most of the semester.
- **After the first two weeks, most class periods will start with a student-led oral forecast discussion** for a scheduled U.S. city/airport. The rest of the period will be spent learning forecasting tools and techniques and/or synoptic meteorology concepts.
- Students will also produce regular **written (e-mailed) forecast discussions** for various U.S. locations.
- **Participation** in all weather discussions is strongly encouraged! **I expect all students not giving a forecast discussion on a particular day to pay attention to and be respectful toward other groups' forecast discussions.** Questions/thoughts are always welcome! In general, the less I talk the better.
- Synoptic meteorology lecture materials that **involve quantitative analysis and/or equations** will mostly **NOT be in PowerPoint**. They will be written on the dry erase board. Come prepared to take notes!

COVID-19 Notes

- **If you cannot make class due to quarantine or illness**, I can record and post lectures you miss on EagleVision Zoom through Canvas. **Please report your illness to Health Services/Dean of Students** so I can receive official documentation and let me know ahead of time so I can remember to turn Zoom on.
- But remember, **in-person attendance is part of your grade, unless you have a university-approved reason to be excused.**
- I understand this can be an uncertain and scary time for all of us. I promise that no matter what your situation, I will work with you. Please feel free to talk with me at any time.

Course Goals

1. Provide students with the fundamental skills required for subjective (manual) and graphical weather chart analysis to identify frontal boundaries and regions associated with large scale ascent.
2. Provide students with an understanding of the dynamical and physical processes impacting the development and evolution of mid-latitude cyclones.

Student Learning Outcomes

1. Subjectively analyze and interpret synoptic charts and satellite images to identify regions of interest (frontal boundaries, thermal advection, vorticity advection, moisture), and describe the limitations of the observations used in the analyses.
2. Explain the three dimensional characteristics of air masses, air mass modification, fronts (warm, cold stationary and occluded), and frontogenesis.
3. Explain the life cycle of baroclinic and barotropic mid-latitude systems, the three-dimensional structure of a developing baroclinic system (including explosive cyclogenesis) and the air flow through the system (conveyor belts).
4. Describe the any extreme or hazardous conditions that might be associated with mid-latitude weather systems and the likely impact of such conditions.
5. Explain the development, structure, and impact of jet streaks and their associated ageostrophic circulations, to include the relationship between the jet stream and the development of mid-latitude depressions.
6. Diagnose synoptic-scale vertical motion in mid-latitude weather systems using QG theory.

7. Explain the characteristics and formation of polar weather systems, including katabatic winds, barrier winds and polar lows.
8. Contrast mid-latitude systems with tropical weather systems.
9. Analyze recent and/or historic weather events to assess the extent to which theories and conceptual models of mid-latitude systems resemble reality.

Additional Student Learning Outcomes

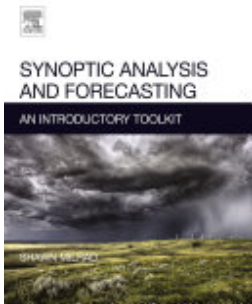
1. Understand the various aspects of the forecast process, including observations, model output, and preparing forecast products.
2. Describe and understand the principles behind ensemble forecast systems and products.
3. Combine information from various sources to explain the current weather conditions, and use basic forecasting techniques, including forecast model output, to forecast atmospheric variables (e.g., temperature, wind, and precipitation) at a specific location.
4. Construct effective written forecast discussions.
5. Demonstrate the ability to effectively communicate analysis and forecast concepts through oral discussions.
6. Describe how the National Weather Service monitors, forecasts, and issues alerts for the weather.

Prerequisite(s): WX 378 Prerequisite is WX 327 and WX 368 and WX 374.

Required Course Materials

Text/Tool: No texts for purchase are required for this course

Optional Course Materials



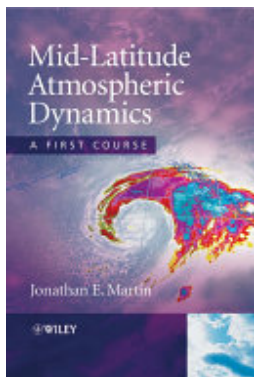
Text/Tool: Synoptic Analysis and Forecasting

ISBN: 9780128092569

Authors: Shawn Milrad

Publisher: Elsevier

Publication Date: 2017-11-16



Text/Tool: Mid-Latitude Atmospheric Dynamics

ISBN: 9781118687895

Authors: Jonathan E. Martin

Publisher: John Wiley & Sons

Publication Date: 2013-05-23

Assessment Activities

Daytona Beach Forecasts (see local forecasts handout)

- **Starts Monday January 24th. Groups of 2 (one group of 3) will produce 7-day forecasts for Daytona Beach each day between Monday and Saturday.**
- Forecasts are due by **noon each day** and must be **entered on the morning (between midnight and noon) that they are due.**
- Forecasts will be **posted to the ERAU Meteorology Website** (<https://wx.erau.edu/weather.php>) and used by the broadcast meteorology courses as well as other entities on campus.
- You will be graded on completion, not accuracy. However:
 - **I will be verifying forecasts starting after the first couple of weeks. Standings will be regularly updated and bonus points will be awarded at the end of the semester to the best performing groups.**
 - **Remember: People on campus will see/use your forecasts!**

University of Oklahoma WxChallenge (see WxChallenge handout)

- Starts Monday January 24th. **After the first two weeks, student-led oral and written forecast discussions will focus on the WxChallenge city.** Groups of 2 (one group of 3) students will rotate responsibility for the discussions (see calendar)
- Forecasts of maximum temperature, minimum temperature, precipitation amount, and maximum sustained wind speed are to be submitted Monday–Thursday by 00Z (7 pm EST/8 pm EDT).
- The forecast location rotates every 2 weeks, with a total of 5 “regular season” cities during the semester (10 weeks total). **Every student is expected to fully participate in the contest.**
- For the contest itself, you will be graded on participation, not accuracy; extra credit will be given to the top 2 forecasters in the class. However, you will receive a numeric grade and full evaluation for all forecast discussions
- For the schedule and more info, **see the WxChallenge handout** and www.wxchallenge.com.

Assignments: Homework and in-class labs:

- There will be approximately 8-10 **assignments** during the semester on various forecasting tools/techniques and synoptic meteorology topics.
- Assignments are designed to help you prepare for the two in-class exams.

Exams:

- There will be two in-class exams:
 - **Midterm Exam:** Friday March 4th or Friday March 11th (we will decide in February). **On paper in our classroom.**
 - **Cumulative Final Exam:** Tuesday May 3rd, 12:30 - 2:30 p.m. **On paper in our classroom.**
- Exams will be based on the **lecture materials and assignments.**
- Study guides will be provided approximately one week prior to each exam.

Grading

- **Forecast discussions and activities (DAB forecasts, WxChallenge) participation/completion: 25%**
- **Synoptic meteorology assignments: 25%**
- **Midterm Exam: 20%**
- **Final Exam: 30%**

Daytona Beach forecast grade bonuses:

- 1st place group (points): +2 points to final course grade
- 1st place group (weeks won): +1.5 points to final course grade
- 2nd place group (points): +1 point to final course grade
- 2nd place group (weeks won): 0.5 points to final course grade

WxChallenge forecast grade bonuses:

- 1st overall student in the class: +3 points to final course grade
- 2nd overall student in the class: +2 points to final course grade
- 3rd overall student in the class: +1 point to final course grade

Attendance will affect your grade in the following ways:

0 unexcused absences	+2.0% to final grade
1 unexcused absences	+1.5% to final grade

2 unexcused absences	+1.0% to final grade
> 6 unexcused absences	Loss of full letter grade

Final grades: *Strictly* rounded to the nearest whole number, i.e., 89.5 = “A,” but an 89.4 = “B.”

Letter Grade	Percentage
A	90 - 100%
B	80 - 89%
C	70 - 79%
D	60 - 69%
F	< 60%

University Policies

ACADEMIC INTEGRITY

Embry-Riddle is committed to maintaining and upholding academic integrity. Academic integrity violations include cheating, fraud, plagiarism, and double-submissions. More specific definitions of these violations and their consequences are described in the Dean of Students’ [Honor Codes and Student Policies](#). To ensure fair and full achievement of degree requirements, students must prepare and present their own work. To show that they have completed their work with academic integrity, students should keep any drafts, notes, calculations, and the like.

Course Policies

1. **Seven or more** unexcused absences will result in an automatic loss of one full letter grade.
2. Students must submit each excused absence in writing (email is acceptable) prior to the start of class (with the obvious exception of personal or family medical emergencies). University-sponsored events require written documentation. Examples of valid excuses are: illness, medical emergency, university-sponsored academic, professional or ERAU athletic events. Oversleeping, personal vacations, and club events are not valid excuses.
3. Please be on time. If you are more than 10 minutes late, it may be counted as an unexcused absence.
4. Late homework will be docked one full letter grade (10%), unless the absence is excused in advance. Unexcused homework and labs over 1 class period late will not be accepted.
5. Academic dishonesty will not be tolerated and could result in dismissal from the University.
6. If you have any difficulties or special needs that hinder your learning in the class, please see me about providing accommodations needed to overcome your difficulties.
7. **CELL PHONES:** During class, please turn all cell phones to vibrate or silent, and **please refrain from checking email, Facebook, Instachat, Snapface, Tick Tock, etc.** during class.
8. **COMPUTER/TABLET USAGE:** Computers are only to be used for forecast discussions, following along with lectures, or when directed by the professor. Please refrain from checking/using E-mail, Facebook, Instachat, etc. during class.
9. **PERSONAL CONVERSATIONS:** Personal conversations are prohibited during class, including cell phone conversations, text messages, Facebook Messenger, Instachat, Snapface, and any other messaging app I am now too old to be aware of.

Student Resources

ACADEMIC ADVANCEMENT (A²) TUTORING CENTER

The [Academic Advancement \(A²\) Center](#) is your direct connection to academic support. The A² Center provides free tutoring and Supplemental Instruction (SI) to all students located on the first floor of New Residence Hall 3 (NH3) on the Daytona Beach campus. The A² Center provides peer led tutoring for foundational math, physics, engineering, biology, chemistry, and writing courses.

Please refer to the [A² Center website](#) for details and schedules.

Math Tutoring Lab provides students necessary resources to succeed in their 100- and 200-level math courses. Location: NRH3 Room 112

Physics Tutoring Lab offers free tutoring in their 100- and 200-level foundational engineering and aviation physics courses. Location: NRH3 Room 118

Engineering Tutoring Lab provides tutoring in foundational ES/EGR courses listed below. Location: NRH3 Room 113

- EGR 115 - Introduction to Computing for Engineers
- ES 201 - Statics
- ES 202 - Solid Mechanics
- ES 204 - Dynamics
- AE 201 - Aerospace Flight Vehicles

Chemistry & Biology Tutoring Lab provides tutoring within foundational chemistry and biology course listed below. Location: NRH3 Room 120

- General Chemistry I & II
- Organic Chemistry
- Biology I & II
- Anatomy & Physiology I & II
- Neurobiology

Weather Tutoring Lab is open Monday through Friday from 9 am to 5 pm and staffed with both virtual and face-to-face tutors who can help you with many meteorology, math and physics courses. The weather lab is located in COA 356.

The Writing Center provides student-led tutoring that adapts to the diverse needs of every writer. We are a teaching and learning service that fosters academic success through the development of independent thinking skills. Visit [Microsoft Bookings](#) to book a session now. Location: NRH3 Room 126

General Study Area encourages students to collaborate with their peers and form study groups at their convenience. Location: NRH3 Room 119

Computer Lab is open to all students and is equipped with standard academic university software and free printing. Location: NRH3 Room 117

The Aviation Learning Center (ALC) in the College of Aviation (COA 141) provides free tutoring on Aeronautical Science and Flight course related topics. Hours of Operations: Monday - Friday, 8 a.m. - 8 p.m.; Saturday 10 a.m. - 5 p.m.

The **ALC** offers access to ten Advanced Aviation Training Devices (AATDs) that are able to simulate both the Cessna 172S and the DA-42 VI, including the Garmin G-1000 avionics, and is equipped with training aids including aircraft components, cut-away instruments, cockpit procedure trainers, Flight Management Systems trainers, reference literature, and much more.

CAMPUS SAFETY & SECURITY

[Campus Safety & Security](#) officers are on duty 24 hours per day, 365 days a year. We strongly encourage students to report crimes, emergencies, or suspicious conditions to Safety & Security by calling the department's Communications Center at 386-226-6480. In the event of an emergency, call 386-226-SAFE (7233).

CANVAS HELP

When logged in to Canvas, click Help – located at the bottom of the global navigation on the left side. This menu has choices for Canvas Support that you can choose from:

- Search the Canvas Guides

- Canvas Support Hotline at 1-833-334-2831, available 24 hours a day, 7 days a week
- Chat with Canvas Support

COUNSELING CENTER

We know that university life at ERAU can be demanding. Balancing academics, work, athletics, finances, family, health, and social life can be stressful. You may experience challenges including struggles with your personal well-being. If you are needing support, the ERAU Counseling Center can provide a calm, friendly and supportive environment for students to address any issue or concern. Counseling is available to all currently enrolled DB students. Counseling is confidential and offered free of charge. They are located in the Wellness Center Complex, building 502 and can be reached at 386-226-6035. For more information about services and hours:

<https://daytonabeach.erau.edu/about/counseling>

**If you find yourself in an immediate mental health crisis, please call Campus Safety at 386-226-6480 or call 911.*

DIGITAL STUDIO

The [Digital Studio](#) offers free digital design tutoring. At the Digital Studio, tutors can assist students with any aspect of the digital design process, including document design, poster design, information visualizations, podcast recording, and video editing. The Digital Studio offers students access to the Adobe Creative Cloud, Final Cut Pro, and a variety of other software. Appointments can be made here: <https://erau.mywconline.com>. You must create an account in order to schedule an appointment. The Digital Studio is located in SU 431.

DISABILITY SERVICES

ERAU is committed to the success of all students. It is a University policy to provide reasonable accommodations to students with disabilities who qualify for services. If you would like to request accommodations due to a physical, mental, or learning disability, please contact the [Disability Support Services Office](#) at 386-226-7916 or by email at dbdss@erau.edu. Disability Support Services' administrative office is located in Building #500. Disability Support Services' Testing Center is located in the Annex Building, room 217 and can be reached at (386) 226-2903.

THE CENTER FOR FAITH AND SPIRITUALITY/CHAPLAINS OFFICE

The [Center for Faith and Spirituality](#) has five prayer and meditation rooms which are open to everyone from 6 a.m. until 10 p.m. There is also the Center for Faith and Spirituality Chapel located in the Center for Faith and Spirituality. There are two chaplains serving the Daytona Beach campus of Embry-Riddle Aeronautical University: Reverend David Keck and Father Tim Daly (Roman Catholic Chaplain). They work with students of all faiths as well as those from no faith tradition.

FOOD PANTRY

We believe access to food is a human right, accessible to every student. We are committed to educating and distributing aid to our Embry-Riddle community. The mission of the Food Pantry program is to support the academic success of students by providing supplemental food for those who are experiencing food insecurity. Students can apply for support through the [Food Pantry Request form](#). A time will be scheduled with the student once the request is received.

HEALTH SERVICES

The [Daytona Beach Health Services](#) clinic is located in Building 500 on the corner of Richard Petty and Clyde Morris Blvd. Health Services will assist students with their medical appointment scheduling, billing, and insurance questions. Health Services can be reached at 386-226-7917 or dbhealth@erau.edu. Health Services is staffed with registered nurses, a nurse practitioner, a physician, a physician assistant, a registered license dietitian, a Flight Medical Support Specialist, and an insurance specialist. When receiving services – whether in-person or virtually – students are required to bring/submit a current copy of their health insurance card. All students are seen and treated at Health Services regardless of their insurance.

HUNT LIBRARY

The Hunt Library is here to help you succeed with finding just the right information resources. For detailed research assistance, please contact [Ask a Librarian](#).

- Website: <https://huntlibrary.erau.edu>
- Email: library@erau.edu
- Phone: 386-226-7656 | 800-678-9428

INTERNATIONAL STUDENT & SCHOLAR SERVICES

International students with questions about I-20s, visas or other related services that assist with the maintenance of their status and immigration compliance should contact [International Student & Scholar Services](#) at 386-226-6579 or dbiss@erau.edu. For other international student related issues and questions such as health insurance, taxes, drivers' licenses, campus work authorization, please contact the International Programs Administration Office at 386-323-8133. Both offices are located on the first floor of New Residence Hall 3.

OFFICE OF DIVERSITY, EQUITY AND INCLUSION

The mission of the Office of Diversity and Inclusion is to advance the campus community's understanding, commitment, and respect for diversity, equity, and inclusion. Through providing and/or supporting education, mentoring, programming, advocacy, and outreach the office fosters an environment that is both beneficial and supportive for all students, faculty, and staff. To learn more about the office, campus offerings and resources, visit the [Office of Diversity and Inclusion ERNIE page](#). Through reviewing the ERNIE page, you can learn ways our office and campus partners strive to create an institutional culture where diversity, equity, and inclusion are ingrained in our community. For additional information please contact diversit@erau.edu. Both the Office of Diversity and Inclusion and the Diversity and Inclusion Lounge are located on the first floor of the New Residence Hall 3 within the International Programs Suite.

STUDENT ATHLETE SERVICES

For student-athletes participating in a full schedule of practice, school, matches/games/meets, know that I am aware of the difficult schedule. Please use your available tutors and academic assistance as needed and offered through the Eagle Study Connection.

[Faculty Athletic Representative \(FAR\)](#)

James J. Pembridge, PhD

Email: pembridj@erau.edu

Phone: 386-226-7097

STUDENT GOVERNMENT

[Student Government Association \(SGA\)](#) proudly offers a variety of services to improve student life on campus. Through its four branches, SGA can fund student organizations, advocate for students, and carry out multiple projects. Besides giving students a voice on campus, SGA also provides students with information and entertainment through *The Avion*, Touch-N-Go Productions, and WIKD radio station.

TITLE IX

[Title IX of the Education Amendments of 1972 \("Title IX"\)](#) is a Federal civil rights law that prohibits discrimination on the basis of sex in education programs and activities. All public and private elementary and secondary schools, school districts, colleges, and universities receiving any Federal funds must comply with Title IX.

The Title IX Office oversees compliance of Title IX Sexual Harassment in accordance with Federal Regulations as well as incidents falling under the University Sexual Misconduct policy. Policy violations can include sexual harassment or sexual violence, such as rape, sexual assault, sexual misconduct, sexual battery, sexual coercion, and stalking.

Anyone **may** report suspected or known violations directly to the Title IX Office. However, there are certain persons / offices who **must** report incidents to the Title IX Office (mandatory). Those are Campus Safety & Security, Dean of Students (or designee), Vice President of Human Resources (or designee). Please refer to the policy and/or contact the Title IX Office for more specifics related to filing a report.

[Title IX Office](#)

Contact information: 386/226-7971; 386/226-6677; 386/481-9131

Online form: dbtix.erau.edu

Email: dbtitle9@erau.edu

UNDERGRADUATE RESEARCH

Embry-Riddle strives to create a culture of knowledge discovery through research. The [Office of Undergraduate Research](#) engages undergraduate students in faculty-mentored research that is both faculty and student-led. Our mission is to provide a diverse set of opportunities for all undergraduate students to enhance their education through engagement in research, inquiry, innovation, and/or other scholarly projects.

VETERANS STUDENT SERVICES

Being a student veteran can result in a variety of complexities that might require accommodations. Complications with VA benefits disbursements, and other unforeseen military-related developments can complicate your academic life. Therefore, please consider making professors aware of your Veteran status and contacting Veterans Student Services.

[Veteran Student Services \(VSS\)](#) facilitates the transition of military-affiliated students from military culture to University life, supports their academic success through informative programming, and assists veterans, active service members, guardsmen, reservists, and military dependents in receiving their military educational benefits. The unit is staffed with qualified school certifying officials who deliver a broad range of services; while providing informal counseling to students using VA educational benefits. In addition, VSS works in collaboration with our [Student Veterans of America chapter](#) and [Faculty-4-Veterans](#), who support the unit in addressing the needs of our military-affiliated students across campus. VSS, which is located in Building 509, can be reached at 386-226-6350 or dbva@erau.edu

WEATHER EMERGENCY STATEMENT

Hurricanes, tornadoes and other natural disasters (such as fires) are a part of life in Florida. In the event a natural disaster threatens our area, everyone at ERAU is expected to monitor voicemail, email, and the local media for any changes to the normal schedule, including evacuation plans. Decisions to close the Daytona Beach campus are typically made sometime in the afternoon on the day before the intended closure. In the event of an emergency during class hours, please listen carefully to directions from your instructor. If it becomes necessary to evacuate the classroom, we will gather at a designated meeting point away from the building and take attendance to ensure everyone is safe and accounted for. As part of the disaster preparedness process, it is strongly suggested that each member of the ERAU community enroll in the RAVE emergency notification system. If you have not done so, please sign up using the link provided on your ERNIE home page.

ERAU Coronavirus Updates

To help keep everyone at Embry-Riddle as safe as possible, we expect all students and employees to take personal responsibility by following these three steps:

- **Get tested *before* classes begin on Jan. 12.**

If you test positive, [follow U.S. Centers for Disease Control & Prevention \(CDC\) guidelines](#). Do *not* come onto campus. Stay away from others for five days. After that, you may resume normal activities, so long as you are asymptomatic and wear a mask for another five days. Pre-semester testing is your responsibility; results do not need to be reported to Embry-Riddle. [Testing and vaccination services](#) will be freely available on campus throughout the spring semester.

- **Wear a mask indoors at Embry-Riddle.**

Particularly in classrooms and during flight training, we expect you to [follow CDC mask guidelines](#), even if you have been vaccinated. Please be respectful of others, keeping in mind those who may be at increased risk. We are aware that many in our community stopped wearing a mask indoors last semester as the pandemic seemed to be easing up. Now, with the highly infectious Omicron variant on the rise, you should *plan to resume masking up indoors*.

- **Get vaccinated before the spring semester begins.**

Have your initial vaccination, second dose or booster shot if you have not already done so. If you have questions, [review the CDC's vaccine information](#).

Course Schedule

- **WX 327 Review (students should do this mostly on their own; PPTs posted on Canvas)**
 - Jet streams/streaks; regions of jet convergence/divergence
 - 500 mb troughs and ridges; vorticity advection
 - Surface cyclones and anticyclones; temperature advection
 - Qualitative mechanisms for ascent/descent (e.g., PVA, WAA)
- **Forecasting tools and techniques**
 - Numerical weather prediction (NWP) post-processed forecast tools: MOS and NBM
 - NWP models and forecast graphics
 - Ensemble NWP model forecast tools
 - NWS/human forecast tools
 - Analogs and standardized anomalies
- **3-D interpretation of the atmosphere**
 - Skew-T diagram and sounding interpretation review
 - Model forecast soundings (Introduction to SHARPy)
 - Vertical cross sections
 - Old-school temperature and precipitation forecasting using soundings

Friday February 18th: No class (out of town). Free 4-day weekend!

- **Thermal wind, jets, and fronts**
 - Thermal wind and thickness applications
 - Jet streams and jet streaks
 - Fronts and frontal analysis
 - Mixed/frozen precipitation forecasting

Midterm Exam: Friday March 4th or Friday March 11th (we will decide in Feb.). In class, on paper.

- **Mass continuity and divergence**
 - Mass continuity equation applications
 - Divergence and vertical motion
- **Thermodynamic energy equation and temperature advection**
 - Thermodynamic energy equation applications including cold air damming
 - Static stability
 - Temperature advection and solenoid analysis
- **Vorticity equation and vorticity advection**
 - Vorticity equation applications
 - Vorticity advection and solenoid analysis
 - Longwaves and shortwaves
- **Introduction to Quasi-Geostrophic (QG) Theory**
 - QG assumptions
 - Getting to the QG Height Tendency and Omega equations

Cumulative Final Exam: Tuesday May 3rd, 12:30 - 2:30 p.m. In class, on paper.

Summary of Important Dates

Date Due	Name (Link)	Event Type	Points
1/17	MLK Day	Holiday	
2/18	No class (out of town)	Holiday	
2/21	Presidents' Day	Holiday	
3/14	Start of Spring Break	Holiday	
3/18	Last Day of Spring Break	Holiday	
5/3	Final Exam	Exam	
2/16	Assignment #1: Model Forecast Tools	Assignment	70

Date Due	Name (Link)	Event Type	Points
2/28	Assignment #3: SHARPy and Forecast Soundings	Assignment	70
3/1	Assignment #2: Even More Forecast Tools	Assignment	60
4/7	Assignment #4: Omega Profiles, Fronts, and More	Assignment	70
4/22	Assignment #6: Vorticity Solenoid Chart	Assignment	20
4/29	Assignment 7	Assignment	60
	Final Exam	Assignment	100
	WXChallenge Discussions Round 3	Assignment	100
	International Forecast Discussion	Assignment	100
	Midterm Exam	Assignment	100
	Assignment #5: Temperature Advection Solenoids	Assignment	20
	WxChallenge Discussions Round 2	Assignment	100
	WXChallenge Discussions Round 1	Assignment	100