SYLLABUS: SYNOPTIC METEOROLOGY LABORATORY (METR 4424)

CLASS TIME: MTWR 2-3:45pm **CLASS ROOM:** NWC 5600

INSTRUCTOR: Dr. Kevin Kloesel, Associate Dean, College of Atmospheric and Geographic Sciences
Interim Director, Oklahoma Climatological Survey

OFFICE: NWC Suite 1100 **OFFICE HOURS:** TBD, or see Lee Anne Sallee in 1100 for appointments
PHONE: 325-3298 **EMAIL:** longhorn@ou.edu

TEACHING ASSISTANTS: Alex Zwink

COURSE WEB SITE: Accessible via http://learn.ou.edu (log in with 4+4)

REQUIRED TEXT AND READING LIST: To be assigned

COURSE GRADE DETERMINATION:

In-class Laboratory Work/Homework	33.3%
Frequent Proficiency Evaluations (no drops)	33.3%
Communications (oral presentations, briefings, writing assignments, etc.)	33.3%

ENROLLMENT: Prerequisite: Grade of C or better in METR3123, METR3223

COURSE GOAL: The purpose of this lecture/laboratory course is to gain an understanding of the observed behavior of the atmosphere through the application of basic theoretical principles. Concepts will be developed for studying atmospheric circulations, particularly extra-tropical cyclones and anticyclones. Laboratory work will include the development of diagnostic techniques suitable for a better understanding of the current weather and will use modern technological tools. Students will be expected to explain theoretical concepts in an oral and written format. They also will be expected to demonstrate mastery in understanding various physical processes that impact weather analysis and forecasting, surface and upper air analysis, fronts and wave cyclones, satellite meteorology, sounding analysis, thermodynamic diagrams, cross sections, forecasting, NCEP models, MOS, radar meteorology, and severe spring and winter weather.

IMPORTANT POLICIES:

Reasonable Accommodation:

The University of Oklahoma is committed to providing reasonable accommodation for all students with disabilities. Students with disabilities who require accommodations in this course are requested to speak with me as early in the semester as possible. Students with disabilities must be registered with the Office of Disability Services prior to receiving accommodations in this course. The Office of Disability Services is located in Goddard Health Center, Suite 166, phone 405/325-3852 or TDD only 405/325-4173.

Academic Misconduct:

All provisions of the Norman Campus Academic Misconduct Code shall apply in cases of academic dishonesty. ANY violation of the Academic Misconduct Code will result in your removal from this course, and a grade of F will be recorded for the course. Academic misconduct is defined as "any act that improperly affects the evaluation of a student's academic performance or achievement." At the University of Oklahoma, academic integrity is expected from each student. Misconduct such as plagiarism, fabrication, and fraud, as well as attempting to commit such acts or assisting others in so doing, will not be tolerated. Students are responsible for knowing the OU Academic Code, which can be found at http://studentconduct.ou.edu/ and www.ou.edu/provost/integrity.

Knowledge Expectations - Synoptic Meteorology Concepts.

• Understand the three dimensional nature of fronts using the wave cyclone model, conveyor belts, and isentropic analysis.

• Understand the concepts of temperature and vorticity advection.

• Understand the concept of the thermal wind relationship and apply the knowledge gained to understand the development, structure, and impact of jet streaks.

• Understand the impact of latent heat release on atmospheric processes including the rapid intensification of cyclones and the structure of mesoscale convective systems.

• Using Quasi-Geostrophic theory, understand the relationships between the advection of temperature and vorticity with vertical motion and structure of the atmosphere.

• Understand the relationship between synoptic scale atmospheric processes and outbreaks of severe weather.

• Be able to synthesize knowledge gained in METR 4424 to understand the four-dimensional nature of the atmosphere and forecast synoptic scale weather conditions.

Knowledge Expectations - Synoptic Meteorology Tools

• Be able to use the thermodynamic diagram in conjunction with observed profiles of temperature, humidity, wind speed, and wind direction to diagnose the vertical structure of the atmosphere in relation to specific weather phenomena.

• Understand the basic concepts associated with analyses of surface and upper air charts.

• Understand the utility and limitations of data used in synoptic meteorology including in-situ sensors, atmospheric soundings, and remote sensing devices (i.e., radar and satellites).

• Understand the utility and limitations of numerical methods used to display and forecast synoptic weather conditions including objective analysis, NMC models, and MOS.

• Be able to communicate weather conditions and phenomena in a clear and concise manner to peers through a series of oral weather briefings.

• Be able to use existing technologies including GEMPAK, GARP, NTRANS, NSHARP, Weather Scope, and html to display and communicate specific weather phenomena.

• Be able to synthesize the tools used in METR 4424 to understand and forecast synoptic scale weather conditions.

Knowledge Expectations - Synoptic Case Study Analysis

• Be able to work within a team of peers during the semester to diagnose physical processes involved in the specific weather phenomena studied within the case study environment.

• Be able to communicate to and educate remaining class peers about the principal findings of the case study.