# GEOG 484

# Advanced Topics in Geography:
# Advanced Studies in Weather and Climate

Spring 2015

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**Course Mission:**

This course seeks to equip you with an understanding of how the weather forecast process operates, from data gathering considerations up to integrated continental-scale forecast delivery and interpretation. There are several broad objectives for the course.

**1. Learn about weather data and how it gets handled.** This includes, for all types of data, the process of getting it from the single reading, through the worldwide transmission system to global national weather services, and onto your radio or newspaper each day.

**2. Learn to recognize and use the weather analysis tools.** This includes the many charts and plots that inform the weather analysis professional. This also includes customizing your extraction of information using the computer tools that the pros use.

**3. Gain experience in the practical application of your theoretical knowledge.** The laws and processes governing atmospheric behavior are integrated in the weather analysis tools. Through them you will learn how your theory translates into the visible weather around you.

**4. Gain further experience presenting information.** Oral conveyance and good communication skills are essential tools in today's world. Thus as part of this class you will be giving presentations on various topics that will include one of: a research paper summary, weather briefing or climate/weather description, or instrument project report.

**5. Gain exposure to research aspects of this topic.** Although the popular perception of synoptic meteorology is the weather forecaster and the charts, this subject also possesses a research component that helps to bring new analysis techniques into the forecast process. We will examine a selection of weather forecasting and weather data research papers.

**6. Gain direct experience handling professional meteorological equipment.** A generous offer from Campbell Scientific Canada Corp. will allow you to gain direct experience on research-grade equipment via a "workshop-practicum" within our course. This will be led by Claude Labine, former president and founder of CSC and now the Chief Scientific Officer. .

These course objectives are translated into specific **learning objectives:**

- Describe how the worldwide system of weather observation gathering and forecasting works
- Know how to use modern computer-based forecasting tools to extract data from standard weather data packages
- Know how to set up an instrumented data gathering system, including understanding appropriate equipment selection, power consumption issues for remote installations, and how to wire the equipment.
- Recognize a variety of operationally used weather charts and other sources of weather data (satellite, radar, surface observation formats such as METAR and the station model)
- Understand how numerical weather forecast models work and how they are operationally applied
- Interpret charts and data in a synthetic manner to explain observed weather and be able to produce a rudimentary, short-term forecast of the weather trajectory
- Give a weather briefing

**Paper discussion**

A selection of research papers will be assigned for reading. Papers will be made available on the CourseSpaces site. Each student will rotate through presentation of detailed analysis of a paper and all students will be expected to participate in discussion. Marks will be given for participation and clarity of presentations.

**CourseSpaces:** This course is hosted on the UVic CourseSpaces system. http://coursespaces.uvic.ca/ I will post various course-related materials or news items here from time to time; make sure you keep a regular eye on the site. Readings will be posted here ahead of classes for which they are required.

**Evaluation:** The course grade will be based on the following:

| | | Date (or date due) | Weight | Grading considerations |
|---|---|---|---|---|
| 1 | Assignments | Listed below | 30% | Accurate numerical or graphical solution, correct steps followed and presented, or if written, thorough assessment, clearly expressed. Emphasis will be placed on clarity of expression because of the crucial role communication will play in your futures |
| 2 | Weather presentation | Assigned in class | 10 % | Depiction of weather situation at hand that captures relevant weather forming parameters. Marks also given for style and clarity of presentation. Non-binding peer evaluation will be conducted. |
| 3 | Paper discussion engagement | No due date | 10 % | Active engagement (and presence) in in-class discussions. **Post comments on CourseSpace blog.** |
| 4 | Mid-term tests | Listed below | 20 % | Two mid-term theory tests (10% each) |
| 5 | Final theory exam | Listed below | 20% | In class final exam focusing on theory |
| 6 | Instruments practicum project | Listed below | 10% | Instrument practicum data analysis project. |

**Tests and evaluation:**

My evaluation philosophy centers around providing numerous opportunities to demonstrate understanding such that it is not one large all-or-nothing exam. Thus there are two small mid-terms and one final that cover GEMPAK material and theory (final is held *in-class*). Tests comprise 40% of your grade. Midterm tests will not take up the entire class time. 40% of your mark comes from assignments, including an assignment covering the instrument practicum. 10% will be your weather briefing. Finally, engagement is important – the real challenge in the workforce is often just showing up – thus 10% of your grade will center around participation and attendance.

Guides will be provided for how to structure a paper discussion and how to conduct a weather briefing.