Overview:

The objectives of this course are simple: students will learn about operational meteorology, study methods of observation and analysis, and practice the basics of weather forecasting. Also, students will work in detail with operational meteorological data sets and codes, and learn how they are decoded and plotted. Additionally, we will study the principles of scalar analysis and their application to surface and upper air data; subjective (hand-drawn) analyses will be heavily employed. In addition to the analysis of basic surface and upper air fields, students will also learn about isobaric, isentropic, cross-section, and sounding analysis methods. Newer, synoptic data sets are also addressed. Time permitting, objective analysis will be discussed.

Associated with this crucial material, include instruction on surface observation preparation, the rudiments of weather forecasting (more of an ATMS-4720 topic), and the use of ntl, a suite of data analysis packages. Concurrent with the last of those will come instruction on the rudiments of the UNIX operating system without which modern analysis software is not generally possible.

Lecture: Monday, Wednesday, and Friday – 10a.m.-10:50 am ABNR 123
Monday, Wednesday, and Friday – 11a.m.-11:50 am ABNR 115
Instructor: Dr. Patrick S. Market
Office: ABNR, Room 331
Office Hours: Monday, Wednesday, and Friday, 9-10 a.m. Also, by appointment
Office Phone: 882 – 1496 (ABNR 331)

Texts:

Required:

- *Weather Analysis*, D. Zrnic, Available at the bookstore.

**The first of these must be purchased from the bookstore. The last two will be photocopied and sold to you at cost in class.

Supplies:

There are certain items that will come in handy in a course like this, and you should have them on hand for *every class*, just in case:

- Regular pencils (required)
- Colored pencils (required): red, blue, yellow, green, purple, brown, black (standard colors)
- Ruler/straight edge, preferably clear; C-Thru makes a good one (required)
- Scientific calculator (required)
- Colored markers (HIGHLY recommended): see colors listed above; I find *Vis-a-vis* markers are excellent, and reasonably priced.
- 3-ring binder (recommended)
Grading System:

<table>
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<tr>
<th>Component</th>
<th>Weight</th>
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<tbody>
<tr>
<td>Exam #1</td>
<td>20%</td>
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<td>Exam #2</td>
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<td>Exam #3</td>
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<td>Lab Work/Homework</td>
<td>20%</td>
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<tr>
<td>Class Participation</td>
<td>10%</td>
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<tr>
<td>Campus Weather Forecasts</td>
<td>10%</td>
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Grading Scale:

<table>
<thead>
<tr>
<th>Percent</th>
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<tbody>
<tr>
<td>92.0-100</td>
<td>A</td>
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<tr>
<td>89.0-91.9</td>
<td>A-</td>
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<tr>
<td>87.0-88.9</td>
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<tr>
<td>82.0-86.9</td>
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<td>79.0-81.9</td>
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<td>77.0-78.9</td>
<td>C+</td>
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<tr>
<td>72.0-76.9</td>
<td>C</td>
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<tr>
<td>69.0-71.9</td>
<td>C-</td>
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<tr>
<td>60.0-68.9</td>
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<td>&lt; 60.0</td>
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Exams: Exams are not comprehensive. Class time will be allotted for review prior to tests. Final grades may be curved if the scores show a need for such. The grades will be curved upward. Therefore, the curve will only help your grade.

Make Up Exams: If you know you won't be able to take a scheduled exam, you must let me know ahead of time so that arrangements can be made to take a make up. Of course, a valid excuse will be needed to take a make up test. No, really!

Homework/Lab Assignments: I will be assigning various lab exercises (decoding, plotting, analyses, etc.) throughout the semester. In addition, I may assign one or more of the COMET modules if time permits. More information on these will follow in the coming weeks.

Late Work: Late work (homework, assignments, etc.) will be accepted, but a penalty will be assessed for each day late (includes weekends, holidays, etc.). The going rate is 10% off per day; for example: an otherwise perfect 10-point homework handed in 2 days late will get you no more than 8 points. Also, if you know that you will be absent for a long period of time (e.g., due to illness), let me know so that we can arrange for class notes and the turning in of assignments.

Attendance: Daily roll call will not be taken. However, the majority of test material will be taken from class notes. Therefore, it will be in your best interest to attend each class. Excessive absence will be noted (this is a fairly small class), and will not reflect favorably in your final grade (e.g., borderline between 2 grades). If you can't make class, please let me know in advance (if possible).

Class Participation: On a related note, class participation is expected. Most of you are on the brink of being professional meteorologists; as such, being able to question and comment on the course content, to question the statements of the instructor and your peers, is crucial. Speak up!
Notes: I do not plan to post my notes on the class website. You, your parents, or someone, paid a lot of money for you to be here in Columbia and in this class. This is an educational system, I might add, that has worked well for centuries. 80% of life is just showing up (see Attendance above), so if you want notes, come hang out with the rest of us and jot them down, or get them from someone else...

Forecast Game: This course will require participation in the UMC-Columbia contest. Forecasts are made Monday through Thursday, unless otherwise noted (due to holidays, conference attendance, etc.). These instances will be announced in advance. In order to pass this course, you must participate in at least 60% of the forecast days. Those who finish 1st, 2nd, and 3rd will have 4%, 3%, and 2%, respectively, added to their final grade at the end of the semester.

Storm Chasing: Should you feel the need to forgo this class for the purposes of storm chasing, be advised that you must return with video or still photography in hand and be prepared to give a 5-minute, substantive, professional presentation to the class on some meteorological aspect of this storm. This will become part of your individual homework grade---if you make no presentation, then a zero (0) will be entered in as a part of your homework average. Confusion on this point may be allayed by re-reading the Attendance or even Notes portions of this document. Lingering confusion will be dispelled totally by speaking with me directly.

The University’s Statement on Academic Dishonesty

Academic honesty is fundamental to the activities and principles of a university. All members of the academic community must be confident that each person’s work has been responsibly and honorably acquired, developed, and presented. Any effort to gain an advantage not given to all students is dishonest whether or not the effort is successful. The academic community regards academic dishonesty as an extremely serious matter, with serious consequences that range from probation to expulsion. When in doubt about plagiarism, paraphrasing, quoting, or collaboration, consult the course instructor.

The University’s Statement on ADA

If you need accommodations because of a disability, if you have emergency medical information to share with me, or if you need special arrangements in case the building must be evacuated, please inform me immediately. Please see me privately after class, or at my office (details above). To request academic accommodations (for example, a notetaker), students must also register with Disability Services, AO38 Brady Commons, 882-4696. It is the campus office responsible for reviewing documentation provided by students requesting academic accommodations, and for accommodations planning in cooperation with students and instructors, as needed and consistent with course requirements. Another resource, MU’s Adaptive Computing Technology Center, 884-2828, is available to provide computing assistance to students with disabilities. For more information about the rights of people with disabilities, please see ada.missouri.edu or call 884-7278.
Course Outline:

1. Introduction, Syllabus, Orientation, Unix/Linux cluster account, Forecasting Primer
2. Calculus refresher
3. METAR reports, Surface Station Model and Plotting
4. TTAA TTBB reports, Rawinsonde Station Model and Plotting
5. Principles of Scalar Analysis
6. Surface Analysis
7. Upper Air Analysis
   • Isobaric Techniques
   • Isentropic Techniques
8. Cross-Section Analysis
9. Sounding (Skew-T log p) Analysis
10. Hodograph Analysis
11. Asynoptic Data:
    • Profilers
    • RASS
    • ACARS
    • Lightning
    • GPS moisture
12. Satellite Imagery Interpretation
13. RADAR Imagery Interpretation
14. Objective Analysis
    • Cressman and Barnes
    • Optimum Interpolation
    • New methods