Geography 622.02: Microclimatological Field Methods and Data Analysis

When: M-W-F 0430P-0618P
Where: Derby Hall 0140
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Course Description and Goals: This course is designed to apply knowledge gained in 622.01 (Boundary Layer Meteorology), and experience the 'real-world' of instrumented field observations. Development of useful data products from the original data is an important goal. Small-scale (micro) meteorological instrumentation, experimental design, electronics, computer-aided data analysis, and logistics techniques are taught from a practical and introductory perspective.

Course Expectations: Exercise and improve attention to detail. Participate in course discussion and field logistics (25% of grade). Develop computer programming skills. Develop and maintain a highly detailed and well organized 'field book' (15% of grade). This course includes outdoor experiments to develop/exercise skills in field data acquisition. A final report evaluates results from a surface energy budget study. Course projects require writing IDL programs to plot and analyze data.

Books: No text book is required, however, Arya (2001)* from 622.01 and Oke (1987) are very useful.
* useful textbooks are listed at end of this document.

Field Experiments: Three field experiments are planned; 1) instrument calibration; 2) radiation balance, and 3) surface energy budget. Our field site is either the roof of Denny hall or the OSU airport.

Grading
10% 622.01 review
15% class participation
30% course projects
15% field book
20% final report
10% final presentation

Late assignments are accepted with a valid excuse.

Prerequisites: 622.01 or equivalent microclimatology course, thermodynamics.

Attendance is critical to your success in this course.
Class Participation is a significant fraction of your grade and involves:

- asking questions
- engaging in the logistics of field experiments
- taking turns in leadership roles

Useful Text Books (key texts in *italics*)

- *Arya, S. P. S., 1988: Micrometeorology, Academic Press, 307 pp., ISBN 0-12-059354-8*
  - *an accessible advanced undergrad introduction to the subject, mostly focusing on surface layer.*
  - *micrometeorology*
- Brutsaert, W., 1988: Evaporation into the Atmosphere, ISBN 90-277-1247-6
  - an excellent reference for boundary layer physics related to the processes of surface water vapor exchanges.
  - micrometeorology
- Garratt, J. R., 1992: The Atmospheric Boundary Layer. Cambridge University Press, 316 pp., ISBN 0521467454
  - Contains a list of other relevant books at the end of the first chapter, including historically important texts.
  - Micrometeorology
- Geiger, R., 2003: The Climate Near the Ground, Rowman & Littlefield Publishers, Inc.; 6th edition (July, 2003), 600 pp. ISBN 0742518574
- Kaimal, J. C. , J. J. Finnigan, 1994: Atmospheric Boundary Layer Flows: Their Structure and Measurement, Oxford University Press, 304 pp., ISBN 0195062396
  - micrometeorology
- Monteith J. L., Unsworth, M.H., 1990: Principles of Environmental Physics, Edward Arnold Publisher, 2nd Ed., 291 pp., ASIN: 0713129816
- Munn, R. E., 1966: Descriptive Micrometeorology, Academic Press, ISBN 1124119973
- *Oke, T.R., 1987: Boundary Layer Climates, 2nd Ed., Methuen, London, 435 pp, ISBN 0-415-04319-0*
  - *microclimatology*
- Sorbjan, Z., 1989: Structure of the Atmospheric Boundary Layer. Prentice-Hall, 317 pp., ISBN 0138535574
  - micrometeorology
- Stull, R. B., 1988: An Introduction to Boundary Layer Meteorology, Kluwer Publishers, 666 pp., ISBN 9027727686
  - idiosyncratic discussion of physics, but nice discussion of the methods, observational and computational tools used in boundary layer meteorology
  - micrometeorology

Schedule: See: http://geog-www.sbs.ohio-state.edu/courses/G622.02/schedule.htm