GEO892 (Section 001), Fall 2017, 3 credits; Tu & Th 5:00-6:20 pm; Geography 126

**Micrometeorological Instrumentation & Measurements**

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Class Webpage: <http://lees.geo.msu.edu/courses/Geo892>

Schedule

08/31/17 (Lecture #1)

Introduction

Reading: Chen et al. 1999. Bioscience

Temperature and dynamics

Class activities

09/05/17 (Lecture #2)

Ohm’s Law

Thermocouple principles (thermopiles) and soil heat flux (HFT3)

Introduction of Loggernet and programing w/ CR10 and CR23

09/07/17 (Lecture #3)

Ta, Tw, Td, relative humidity, vapor pressure, and VPD

 Thermistor, IR surface temperature, barometer

Programming with HMP45C (Ta & RH) and Surface Temperature Sensors in CR23

Homework #1

09/12/17 (Lecture #4)

Stefan-Boltzmann Law

Radiation (long and short radiation), albedo, Greenhouse effects

Radiometers (PAR, pyranometer, CNR4, Q7.1) and CR23

09/14/17 (Lecture #5)

Wind speed, wind direction, windrose

Precipitation (TE525)

Wind Monitor and CR23

09/21/17 (4:00 – 18:30 h) (Lecture #6-7)

Sensible heat (H), latent heat (L), heat storage, Bowen ratio

ET vs LE, transpiration (sap flow)

Energy Balance (Rn=LE + H +G)

Gradient methods

09/26/17 (4:00 – 18:30 h) (Lecture #8-9)

Development of full weather station

Homework #2: Design, programming, maintenance, and preliminary results

09/28/17 (Lecture #10)

Eddy-covariance method: principles and requirements

10/03/17 (12:00 – 8:00 h) (Lab #1)

Eddy-covariance (EC) method: principles and requirements (cont.)

Programming with CRBasic Editor w/ CR5000

10/10/17 (12:00 – 8:00 h) (Lab #2)

Introduction of EC sensors (CSAT3, LI7500)

Design of a complete EC tower

Homework #3: Modeling FCO2 and ET (TBD)

10/20/17 (8:00 -17:00 h) (Lab #3)

Tower installations

Summary and term paper(s)

10/24/17

Term paper & discussion

Maintenance and data (Q&A #1)

10/26/17 (Lecture #11)

Data processing,

11/07/17

Maintenance and data (Q&A #2)

11/14/17

Maintenance and data (Q&A #3)

11/21/17

Maintenance and data (Q&A #4)

12/07/17 (Lecture #12)

Overview

Term paper due on Dec. 14, 2017