The Return of the Mini-Course:
Online and Field-Based Applied Meteorology for Majors

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With thanks to:
Some History

• Science Electives include traditional 3 credit classes, and 1 credit “mini-classes” that ran 5 weeks each

• They could be taken simultaneously or in sequence; e.g.,
  - Geology of our National Parks
  - Marine Myths, Mermaids, and Monsters
  - Weather at its Worst

• I was a **history** major – these courses had an impact on me
Meteorology Curriculum in Liberal Arts State University – Florida Style

• **Constraints:**
  - 36 hours liberal studies
  - 12 hours foreign language
  - By SUS articulation agreements, Unique BS must accept all AA transfers and allow graduation in two years

• **Realities:**
  - 1st MET course has the following prerequisites:
    - Calc I, Physics A, Chemistry
  - Must fit entire curriculum in two years!
FSU Meteorology BS Degree

**Required**

- General Chemistry*
- Calculus I, II, III*
- Ordinary Differential Equations*
- Statistics for Scientists & Engineers
- General Meteorology
- Physical Climatology
- Weather Analysis and Forecasting
- Meteorological Computations
- Intro to Atmospheric Dynamics

*may be taken at other schools

**Physical Meteorology I & II**
- Thermo, cloud physics, radiation, remote sensing

**Dynamic Meteorology I & II**
- Holton (8-10 chapters)

**Synoptic Meteorology I & II**
- Analysis of synoptic, meso-\(\alpha\) scale phenomena, primarily of midlatitudes

**Electives**

- Current Weather Discussion
- Weathercasting
- Instruments and Observations
- Operational Meteorology (NWS)
What Our Students are *W*ere *N*ot (Necessarily) Seeing (Recently)

- Tropical and Subtropical Meteorology*
- Mesoscale Meteorology*
- Air Pollution
- Boundary Layer Meteorology*
- Instrumentation
- Technical Writing
- Space Weather / Aeronomy*
- Climate Change*
- Numerical Weather Prediction*
- Coastal Meteorology*
- Air-Sea Interaction*
- Lightning*

* areas of interest in Florida, or areas of research specialization at FSU
Learning to Teach (Again)

- Lessons from K-12 Teachers
- Lessons from Online Learners
- Lessons from AMS Educational Symposium Presenters and Discussions
- FSU’s Learning Systems Institute
  - Shared Mental Models – Team vs. Individual Knowledge
Solutions

- First – is there a problem? (at FSU)
- Yes! Compare notes with colleagues at other institutions and also new AMS guidelines!
- Are there solutions! YES!
What does MetEd Offer?

- 317 Modules in 18 Different Areas
- Quizzes!
- Automatic Scoring with Score Reports
- Transcripts
- Students *may* get NOAA credit for completed modules

What Could FSU Offer?

- Tropical Meteorology
- Mesoscale Meteorology
- Air Pollution
- Boundary Layer Meteorology
- Satellite Meteorology
- Coastal Meteorology
- Teaching Meteorology
- Hydrometeorology
What Does the Class Look Like?

- 1 class meeting 1st week of classes (orientation)
- 1 class meeting last week of classes (week 15 – summary and evaluation)
- 1 field trip
- Online Blackboard discussions (sometimes)
- 12-21 modules (20-30 hours)
- 1 credit (4000-level)
- Each module list selected by instructor (so far, just me!), but each class has unique prerequisites based upon our present curriculum
Sample Class

Intro to Coastal Meteorology

- Nature of Waves
  - Wave Types, Life Cycles, Swell, Shallow
- Tides and Currents
  - Introduction Currents & Tides; ENSO
- Ocean Models
  - Introduction to Ocean Models, Marine Wave Model
  - Wave Watch III, Wave Ensembles
- Observations and Forecasting along the Coast
  - Marine Customers
  - Rip Currents, Scatterometry
  - Marine BL, Sea Breezes, Landfalling Fronts
  - Gap Winds, Coastal Jets, Fog

Structure / Assessment

- ~30 hours of estimated completion time per 1 credit class
- 90% of grade based on module quizzes
  - 10 90% or higher on the 1st attempt
  - 9 90% or higher on the 2nd or 3rd try
  - 8 90% or higher on the 4th or 5th try or 80% or higher on 1st attempt
  - 7 80% or higher on the 2nd - 5th try
  - 6 passing score (MetEd definition) achieved on 1st through 10th attempt
  - 3 non-passing score as highest of 10 attempts
- 10% based on participation (field trip to FSU Marine Lab, discussions)
Other Classes

• Introduction to Air Pollution Meteorology
  - 17 MetEd Modules
  - Basics of Atmospheric Dispersion
  - Dust and Aerosols
  - Modeling Applications
  - Fire Weather Applications
  - Emergency Management Response
  - Public Health and Climate Change Applications
  - Field Trip to EPA/DEP AirNow Monitoring Site

• Introduction to Hydrometeorology
  - 21 MetEd Modules
  - 14 from Basic MetEd Course
  - Field Trip to Stream Gauge (NWS/USGS/WMD)
Other Classes

- Introduction to Climate Change
  - 13 MetEd Modules
    - From Arctic to the Tropics
    - Coastal Regions
    - Drought, Statistics
  - FSU/NSF Antarctic Core Facility Field Trip

- Introduction to Aviation Weather
  - ~18 MetEd Modules
  - Poorly subscribed
  - Field Trip to Airport FAA weather station (ASOS)

- Introduction to Boundary Layer Meteorology
  - ~16 MetEd Modules
Other Classes

- **Introduction to Tropical Meteorology**
  - Revamped to take advantage of the 2nd edition of the new text by Laing and Evans!
  - Working through all online chapters (1st time through in this style Spring 2012)
  - Field trip to Florida EOC (aka, the house that Andrew built)

- **Introduction to Mesoscale Meteorology**
  - First time offered Spring 2012
  - 18 MetEd Modules
  - Field Trip to FSU Mesonet Site
Summary

Impacts & Findings

- Courses began 2008-2009
- 2-3 offerings per semester, including summers
- 4-10 students per section; 122 total over 3 years
- Student satisfaction is very high (based upon standard FSU course evaluations)
- It is a hard sell to get seniors to take “extra” classes
- Transfer students often cannot take electives unless they are in the 5 year plan (many are)

Future Goals

- New Course – Space Weather
- Revamp Aviation Wx
- More Faculty Involvement
- Offer online for non-FSU degree-seeking students?
- Structure other courses around “Level 1” modules to allow for participation among lower-level students?
- Assess the assessment system – is it honest?
- Carry out systematic evaluation of effects/likes/dislikes

http://yankee.met.fsu.edu/~paul/Mini/