6.15 ADOPTING AN IN-SITU SURFACE METEOROLOGICAL NETWORK FOR DEVELOPING A METEOROLOGICAL INSTRUMENTATION COURSE AT NORTH CAROLINA STATE UNIVERSITY

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"No one but the modeler believes in his results; everyone except the observer believes in his data"! We seek to improve on this perception through a project under National Science Foundation's Awards to Facilitate Geophysical Education (AFGE). This project underway at North Carolina State University seeks to design, implement, and evaluate the development of undergraduate level course with a focus on meteorological instrumentation and observations of climate variables, along with the analysis and interpretation of climate data, and community interactions to develop cause - effect associations. A number of meteorology and geoscience courses do a sufficiently intensive job of educating the students on the skills required for dynamical aspects of the hazard prediction, as well as the physics of the environmental quality, there is a lack of cross - disciplinary foci on assessing the issues pertaining to climate monitoring, variability and feedback. Hence, it is pivotal that undergraduate students are educated on evolving emphasis on climate and social interactions. Study areas specially highlighted, and relevant, to the educational needs include: understanding climate monitoring, and climate variability, assessing the interactions of natural and human systems; and the role of the observational and modeling capabilities to address these problems

Project objectives are to: (i) Educate and Train undergraduate students with practical applications of field instrumentation, measurements and observations; (ii) Introduce students to the synthesis of heterogeneous instrumentation output, with human observations, for data assurance and interpretation, and multidisciplinary applications, and (iii) Promote and Emphasize student - community interactions for understanding the microvariability in climatological observations, and its feedback on regional perceptions.

The project design, management, evaluation, and execution will expand over the five technological and assessment strategies to: (i) create data and information links for "real" life events for student assessments; (ii) make curriculum outcome available for peers to utilize in their curriculum; (iii) promote hands - on project based experimentation, field measurements, and data interpretation skills through terms projects; (iv) create interpretation pathways using internet for models and large databases with students and researchers; and (v) develop a model that can be adopted by community of researchers and academicians on content issue and community partnership. The course is focused on the issue of educating students on climate analysis both as a monitoring and outlook problem, along with a cause and effect based policy problem through community partnerships and feedback. The student interactions will involve hands - on training with meteorological instrumentation and analysis of climate variables using real - time and archived data, and web-based models. The course will be designed to be flexible, emphasizing critical – thinking amongst the students. However, the course content will still have basic components such as data analysis, measurement principles, calibration and QA / QC, and data and model integration. We expect that the flexible format will induce even more learning than the traditional pedagogy.

We will discuss the application of an array of field – tested instrumentation (radiation, micrometeorological, and air pollution related) and calibration facilities, and a statewide operational / research sites (such as NC Environmental and Climate Observational Network– with AgNet, ASOS, AWOS, and volunteer observers, and field laboratories at Mt. Mitchell, Black Mountain, and NC Agricultural Research Stations), for such an application. The broader application of such a course is the development of different exploratory analyses using in-situ observations available through different university networks.

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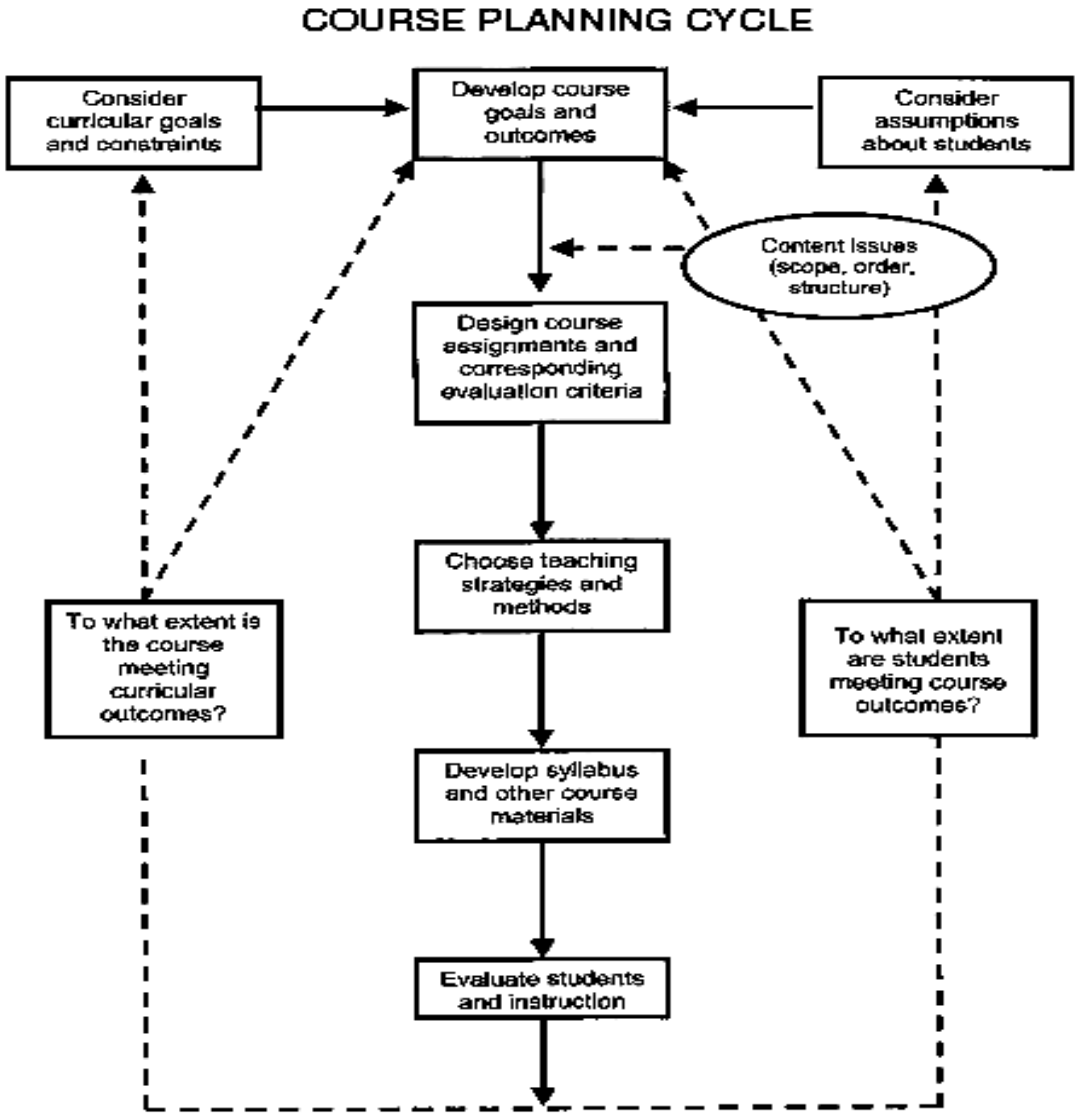
A course planning layout adopted for this project is summarized in the following flowchart:



The project also builds on an existing surface observational network called the North Carolina Environmental and Climate Observing Network (NC ECO Net), which comprises of over 100 surface observing stations providing real-time hourly weather and climate observations across North Carolina. An additional component of the enquiry guided learning system is to discuss the issue of errors and calibration in measurements as well as the role of microvariability in developing climate scenario projections. It is recognized that effects of microvariability and community perception are commonly lacking in educating the students, and the community in general. Thus, important factors related to this issue that will be included are: (i) microvariability in the climate events, (ii) the need to monitor this variability, (iii) the influence of such interactions in developing outlooks and (iv) interpreting the data and information in a societal perspective. Another example of the microvariability is often encountered in understanding the changes in the agricultural or hydrological droughts, and monitoring subsurface variables such as soil moisture (due to precipitation variability). These concepts will be actively integrated in learning, via interaction with the community and interpreting the feedback between the measurements (and the footprints of the measurements), forecast, and community perception.