

Geog 410 Modeling of Environmental Systems Spring 2016

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Class Time: TR 11:00-12:15pm, 322 Carolina Hall

Course Description: The environment is a dynamic and living system in which the interactions of numerous biological, biophysical and biogeochemical processes determine the rate and the direction of change. A comprehensive understanding of the past and current status of the environment and prediction for its status in the future cannot be achieved without the help of computer-based models. On the one hand, computer-based models can integrate natural history, physiological, and ecological information that has been gathered over many years by many people; on the other hand, computer-based models can simulate the environment in various hypothetical conditions (e.g. what happens in the Earth's biosphere if [CO₂] in the atmosphere doubles?). Geog 410 takes a system's view of the environment, and introduces the fundamental concepts and approaches in modeling of environmental systems. Essentially all environmental processes are driven by energy associated with flow of matter (e.g. water and nutrients). The course will be focused on modeling the dynamics of energy and matter flow through the environment, including the energy and matter flow in the natural environment and that with human disturbance. Throughout the course, we will use the Matlab as the tool to assist us to model the environmental systems. The course is composed of three components: instructor lectures, hands-on experience in using Matlab to model the environmental systems and in class discussions. The objectives of the course include: (1) understanding of the fundamental principles how environmental systems work, (2) understanding of systems thinking, and (3) proficient use of Matlab in solving problems of similar nature in the future.

