This course is a simulation elective for the Systems Engineering, Engineering Management, Operations Research, and Systems Management majors. Simulation modeling can be used to study the effects of changes to existing systems or processes, or evaluate the performance of new systems prior to their implementation. The techniques taught in this course are a significant part of the Systems Decision Process (SDP) as they introduce the concept of dynamic systems thinking and analysis. By their nature, large scale systems are dynamic. These systems involve complex cause and effect relationships that form feedback loops between the variables of interest. These systems produce outcomes that are not always intuitive. The cadets use the properties of dynamic systems and analytical techniques to design continuous models of complex systems or processes, implement these models, and perform an analysis of the results. Topics include applications of System Dynamics, client/modeler relationships, problem articulation, functional modeling through causal loop diagrams and stock and flow diagrams, modeling and simulation in a PC-based continuous event simulation package, policy design, policy testing, and policy implementation. These concepts and principles are applied to military and civilian applications such as physical systems, human decision processes, population, and economic/business processes. Cadets develop communication skills by presenting their design results in both written reports and oral presentations. The course also addresses ethical implications in the development and application of dynamic models as well as interactions with decision makers. Cadets will spend several lessons in a computer lab environment.

**Lessons:** 40 @ 55 min (2.500 Att/wk)  
**Labs:** 0 @ 0 min

**Special Requirements:** Course design project.

**Disqualifier(s):** EM484