



SYSTEM DYNAMICS MODELLING PRACTICUM

The System Dynamics Modelling discipline provides a framework involving qualitative description, exploration and analysis of systemic problems in terms of processes, business rules, information and boundaries, thereby facilitating quantitative computer simulation modelling and analysis to assist understanding of the underlying reasons for observed dynamic behaviour.

This course introduces students to using System Dynamics Modelling to analyse and understand our complex world.

It is assumed that students have completed the *Systems Thinking and Modelling* course. This course requires students to be familiar with Microsoft Windows and have an understanding of undergraduate-level mathematics.

Attendees receive a set of comprehensive course notes and a copy of "Business Dynamics Modelling: A Modular Approach to Enable Understanding of Our Complex World" which contains a compendium of models developed in Powersim® Studio.

COURSE OUTLINE

The steps to be taken in building System Dynamics models are described.

Students will be taken step-by-step through model building, with each step supported by a set of exercises, covering:

Problem structuring, during which the problem is defined and the scope and boundaries of the study are identified.

Causal modelling and analysis, during which conceptual models of the problem are created, which involves: identifying key variables; drawing graphs depicting behaviour over time, describing the reference modes of behaviour; developing causal diagrams to illustrate the relationship among the main variables; analysing causal behaviour to identify how changes occur over time; identifying leverage points to which management effort and resources may be applied with greatest effect; and developing preliminary intervention strategies.

Dynamic modelling, during which: systems diagrams showing the main sectors of a potential simulation model and the main variables to be investigated, are developed; variable types are defined and modular stock and flow diagrams are developed for each relevant sector of the problem; relevant 'business rules' are defined and information collected to enable the system dynamics model to be populated; computer simulation models based on the causal analysis conducted earlier, are created; the model is simulated over time and graphical and tabular output is produced; the model is validated to ensure that it is consistent, repeatable and reliable; tests are performed to gauge the sensitivity of model parameters; the model is used as the basis for designing and testing policies, to address the issues of concern to management and to reveal systemic improvements.

For this course, computer simulation models will be produced using Powersim® Studio.

http://www.unsw.adfa.edu.au/bdo/short_courses/index.html