

# 國立臺北大學自然資源與環境管理研究所

## 100 學年度第二學期『環境系統分析』

### 課程講義(一)：課程簡介

- GOALS OF THE COURSE

- Handout Download: <http://web.ntpu.edu.tw/~yml/download/system2012s>
- Content ⇒ Systems Analysis Models and Applications Concerning the *Environment*
  - ⇒ Systems vs. Systems Analysis
  - ⇒ Systems Analysis vs. Operations Research (Operational Research)
  - ⇒ Systems Analysis vs. System Simulation
  - ⇒ Systems Thinking and System Dynamics
  - ⇒ Programming vs. Planning ⇒ Simulation and Optimization
  - ⇒ Conceptual models ⇒ Mathematical models ⇒ Simulation/Optimization models
- Mathematical Models
  - ⇒ Classification: Prescriptive vs. Descriptive; Deterministic vs. Stochastic
  - ⇒ Solution Techniques: Symbolic/Graphical Interpretation; Analytical vs. Numerical
  - ⇒ Algorithms, Numerical Methods ⇒ Linearity, Convexity, and Complexity

- OPTIMIZATION AND SIMULATION SOFTWARE

- Problems or Models
  - ⇒ Linear vs. nonlinear; constrained vs. unconstrained; continuous vs. discrete
- Platform and Programming
  - ⇒ Command-line vs. Windows; Editor-oriented vs. Object-oriented
- Programming Skill
  - ⇒ Solver package vs. Program coding ⇒ Compiling vs. Running of Program codes

- SOFTWARE TO BE COVERED

- [GAMS \(General Algebraic Modeling System\)](#):  
“GAMS is a high-level modeling system for mathematical programming problems.”
- [LINGO \(LINDO System's Product\)](#):  
“LINGO is a comprehensive tool designed to make building and solving linear, nonlinear and integer optimization models faster, easier and more efficient.”
- [What'sBest! \(LINDO System's Product\)](#) lets you build linear, nonlinear, and integer models in Excel. Models are easy to build and understand using standard spreadsheet equations.
- [Vensim \(Vensim from Ventana Systems\)](#): “Vensim is used for developing, analyzing, and packaging high quality dynamic feedback models.”
- [ExpertChoice](#): A decision support software using Analytical Hierarchy Process (AHP)
- [EULER](#): “EULER is a numerical matrix system. It is not a MatLab clone, but very similar to that.”