

CEE 340

Civil & Environmental Systems Analysis

- Catalog data:** 20-CEE-340. Civil & Environmental Systems Analysis. 3 cr. Introduction to systems analysis of Civil & Environmental Engineering Systems including methodology and applications. Linear & integer programming, critical path method, and engineering economics, with application to structural, water resources, transportation engineering systems.
- Prerequisites:** CEE computational methods (20-CEE-175); Differential Equations (20-MATH-273); Matrix Methods (20-CEE-276)
- Textbook:** *Civil & Environmental Systems Engineering* by ReVelle, Whitlatch, & Wright (1997, reprinted w/corrections, June 1999), Pearson Education.
- References:** Journal articles; Notes and homework assignments available at <http://www.cee.uc.edu/~juber/courses/cee340/cee340.htm>
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- Goals:** There are two major objectives to keep in mind. The most important is to learn about and explore some techniques that can assist us, as Civil & Environmental Engineers, in how to effectively plan or design the systems we deal with. These techniques include the various methods of mathematical programming, and mainly linear programming (LP), but to a lesser extent also dynamic programming and integer programming. The second objective is to understand that mathematical modeling is an art and to further develop modeling skills that can be useful in formulating decision models for difficult planning and design problems.
- Lecture or Lab Topics:**
1. Explaining Systems Analysis
 2. Example Models and Graphical Solution
 3. The simplex algorithm
 4. The simplex algorithm (continued)
 5. Multiobjective methods
 6. Integer Programming / Network Models
 7. Integer Programming / Network Models (continued)
 8. Modeling to Generate Alternatives (MGA)
 9. Scheduling models / CPM
 10. Scheduling models / CPM (continued)
- Computer Usage:** Students make extensive use of Excel and also Excel Solver (which they learn in class) for formulation and solution of decision models that include quantified objectives and constraints.
- ABET criterion 3:** a,c,e,h,i,j,k
- ABET criterion 8:** a,e,f
- Date prepared:** January 21, 2004, Last Update : April 25, 2007