# **UNIVERSITY OF NEBRASKA AT OMAHA**

## MATH/CSCI 4300/8306 Deterministic Operations Research Models

### MW 7:00-8:15 pm | On-Campus | Dr. Betty Love

Prerequisite: MATH 2050 with a C- or better or permission of instructor.

Operations research is a scientific approach to decision making that seeks to best design and operate a system, usually under conditions requiring the allocation of scarce resources. Operations research saves lives, saves money, and solves problems. Operations research models are used daily to **optimize** systems from several industries including:

- Logistics, transportation, and supply chain
- Financial systems
- Manufacturing
- Health care, medicine, and public health
- Oil, chemical, and mining industries
- Food and energy systems
- Agriculture
- Military and defense

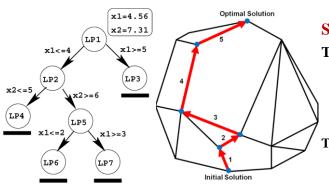


This course will study modeling and solution methods of some classical operations research models such as linear, integer, and network programming.

#### **Optimization Modeling**

Model and solve complex systems using commercial and open-source software (e.g. CPLEX, Gurobi, COIN-OR, etc.)

- Blending and production process problems
- Inventory and multi-period decision problems
- Transportation and transshipment problems
- Traveling salesman and vehicle routing problems
- Knapsack and multiple knapsack problems
- Assignment and matching problems
- Covering, node packing, and bin packing problems
- Facility location, fixed charge, and network problems





#### **Solution Methods**

#### The simplex method for linear programming

- Understand the mechanisms and theory of the simplex method to solve linear programs
- Evaluate the sensitivity of linear programs
- Understand and apply duality theory to solve linear programs

#### The branch and bound algorithm for integer programming

Do you want to learn the impact of operations research? Visit https://youtu.be/9-MITCoka-Q

#### For More Information: Dr. Love | 402-554-2831 | blove@unomaha.edu

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