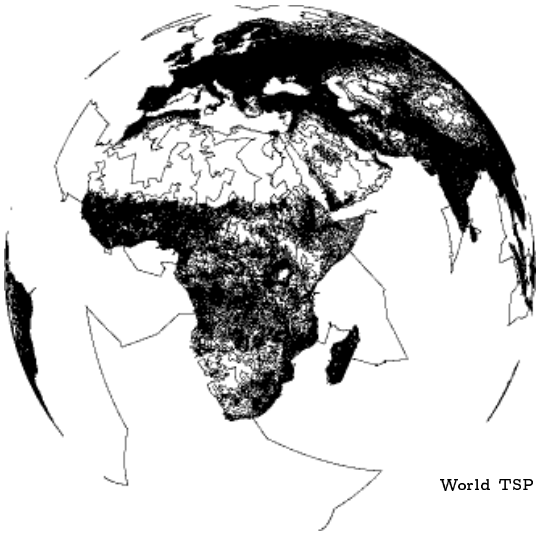
APPROXIMATION ALGORITHMS

"Although this may seem a paradox, all exact science is dominated by the idea of approximation."
Bertrand Russel

- **Course number:** CIS6930
- **Semester:** Fall 2005
- **Schedule:** Tue 5, Thu 4-5
- **Location:** Turlington 2328
- **Professor:** Alper Üngör
  E430 CSE Building
  ungor@cise.ufl.edu
- **Catalog number:** 3993
- **Credit hours:** 3
- **Prerequisites:** COP 3530
  or equivalent, or Instructor's permission



World TSP

Approximation algorithms have been developed in response to the impossibility of solving a good many problems exactly. In the case of NP-Complete problems, we sacrifice optimality in favor of a "good" solution that can be computed efficiently. Trading-off optimality in favor of tractability is the paradigm of approximation algorithms. This course will cover the fundamental concepts in approximation algorithms.

Concepts, Methods	*Application Domains*
Hardness	*Covering, Packing, Clustering*
Graph theory	*Cutting, Coloring, Counting*
Greedy methods	*Geometric problems*
Rounding	*Computational biology*
LP-relaxation	*Computer graphics*
Semidefinite programming	*Network problems*
Primal-dual schema	*Operations research*
Randomized algorithms	*Scheduling, Facility location*

- **Course-work:** Grades will be based on homeworks (30%), a semester project (40%), and an exam (30%). For their projects, students are expected to pick a problem in one of the application domains, and design and/or implement one or more (new or existing) algorithms solving it.

- **Textbook (recommended):**
  1. *Approximation Algorithms.* V. Vazirani, (Springer, 2003).
  2. *Approximation Algorithms for NP-Hard Problems.* D.S. Hochbaum, (PWS, 1997).
  3. I will also distribute other papers and sources.