



THE OHIO STATE UNIVERSITY
COLLEGE OF ENGINEERING

Computational Optimization

ISE 7270

Credit Hours:

3.00

Course Levels:

Graduate

Course Components:

Lecture

Course Description:

This course focuses on how to determine, empirically and theoretically, if one optimization algorithm is 'better' than another.

Prerequisites and Co-requisites:

Some familiarity with programming basics, complexity theory, Optimization (e.g. ISE 5200, ECE 5759, etc.), optimality conditions (e.g., global v. local, KKT, duality).

Course Goals / Objectives:

- Design computational experiments, perform analyses, and present such results comparing optimization algorithms
 - Identify what computational complexity theory, and computational experiments can and cannot tell us about algorithm performance
 - Understand how hardware, compiler, programming language, and optimization solver choice can affect optimization algorithm performance
 - Apply scientific computing and numerical analysis to help analyze and design optimization algorithms
 - Identify different types of optimization algorithms (deterministic vs random, local vs global, etc.) and navigate inherent apples-to-oranges comparisons
 - Identify both theoretical and practical complications inherent in analyzing parallel optimization algorithms
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Course Topics:

- Computing systems
 - Mathematical programming
 - Computational complexity: theory vs reality
 - Heuristic vs exact, local vs global algorithms
 - Experiment design and analysis
 - Numerical analysis and scientific computing
 - Parallel computing for optimization
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Designation:

Elective