

Teaching Experience

Cornell University

- ENGR 1101 Engineering Applications of Operations Research
 - 40 students in Fall 2015, 41 students in Spring 2016, 80 students in Fall 2017
 - Topics: Traveling salesman problem, shortest path problem, minimum spanning tree problem, maximum flow, baseball elimination, transportation and assignment problem, linear programming, linear programming duality, integer linear programming, branch and bound
 - Teaching evaluations (overall teaching effectiveness): 4.37, 4.68, 4.17
- CS 4820 Introduction to Analysis of Algorithms (co-taught with Bobby Kleinberg)
 - 450 students in Spring 2017
 - Textbook: *Algorithm Design* by Jon Kleinberg and Éva Tardos
 - Topics: Greedy algorithms, divide and conquer, dynamic programming, network flow, undecidability, computational complexity (focusing on NP-completeness), approximation algorithms
 - Teaching evaluations (overall teaching effectiveness): 3.98
- ORIE 3310/5310/5311 Optimization II
 - 102 students in Spring 2018
 - Topics: Network optimization, dynamic programming, integer linear programming, nonlinear optimization
 - Teaching evaluations (overall teaching effectiveness): 3.81

College of William & Mary

- Math 111 Calculus I
 - 2 sections (33 and 35 students) in Fall 2012, 2 sections (35 and 38 students) in Fall 2013, 1 section (33 students) in Spring 2015
 - Textbook: *Single Variable Calculus, Early Transcendentals, 7th edition* by James Stewart. (Chapters 2–5)
 - Topics: Limits, differentiation and applications of differentiation
 - Teaching evaluations (overall teaching effectiveness): 4.04, 4.12, 3.73, 4.11, 4.17
- Math 112 Calculus II
 - 2 sections (34 and 37 students) in Spring 2014
 - Textbook: *Single Variable Calculus, Early Transcendentals, 7th edition* by James Stewart. (Chapters 5–11)
 - Topics: Integration and applications of integration, sequences and series
 - Teaching evaluations (overall teaching effectiveness): 3.89, 4.15
- Math 150 Freshman Seminar “The Computational Universe”
 - 17 students in Fall 2013
 - Designed course from scratch
 - Topics: (Euclidean) geometry, lunes, trisecting an angle, squaring the circle, axiomatic approach, intuition, Cantor’s Theorem, Turing machines, halting problem, computational complexity, zero knowledge
 - Teaching evaluations (overall teaching effectiveness): 4.76
- Math 211 Linear Algebra
 - 35 students in Spring 2013, and 34 students Fall 2014
 - Textbook: *Linear Algebra and Its Applications, 4th edition* by David Lay. (Chapters 1–6)

- Topics: Linear equations, linear transformations, matrix algebra, LU factorization, determinants, vector spaces, eigenvalues and eigenvectors, orthogonality, Gram-Schmidt
- Teaching evaluations (overall teaching effectiveness): 4.35, 4.46
- Math 323 Introduction to Operations Research
 - 32 students in Fall 2012
 - Textbook: *Optimization in Operations Research* by Ronald L. Rardin
 - Topics: Modelling using linear and nonlinear models, local search methods, linear programming and duality, integer linear programming (branch and bound, Gomory cuts), Traveling Salesman Problem
 - Teaching evaluations (overall teaching effectiveness): 4.37
- CSci 638 Nonlinear Optimization
 - 11 students in Spring 2013, and 6 students Fall 2014
 - Textbook: *Numerical Methods for Unconstrained Optimization and Nonlinear Equations* by J. E. Dennis, Jr. and Robert B. Schnabel; *Numerical Optimization, 2nd edition* by Jorge Nocedal and Stephen J. Wright
 - Topics: Newton's method and Quasi-Newton's methods for nonlinear equations and unconstrained optimization, line search methods, Armijo-Goldstein conditions, secant methods (Broyden's method, Powell's method, BFGS), KKT conditions, interior points methods
 - Teaching evaluations (overall teaching effectiveness): 4.70, 4.83
- CSci 688 Combinatorial Optimization
 - 12 students in Spring 2014
 - Designed course from scratch
 - Topics: Minimum spanning trees, Steiner trees (and variants thereof), P and NP, NP-completeness, set cover, matchings (bipartite and non-bipartite), Hall's Theorem, approximation algorithms (for Traveling Salesman Problem and Steiner Trees), shortest path problem (Dijkstra's algorithm), matroids and matroid intersection
 - Teaching evaluations (overall teaching effectiveness): 4.78
- CSci 688 Stochastic Optimization
 - 14 students in Spring 2015
 - Textbook: *Introduction to Stochastic Programming* by John R. Birge and François Louveaux
 - Topics: Stochastic Programming Modeling Concepts, Two-Stage Stochastic Linear Programming, L-shaped method, Secretary Problem, Ranking and Selection of Random Systems, Boosted Sampling
 - Teaching evaluations (overall teaching effectiveness): 4.50

Chinese University of Hong Kong (at Shenzhen)

- MAT 2040 Linear Algebra
 - Textbook: *Linear Algebra and Applications, 9th edition* by Steven Leon.
 - 175 students in Fall 2018
 - Topics: Linear equations, Gaussian elimination, matrix algebra, LU factorization, determinants, vector spaces, eigenvalues and eigenvectors, orthogonality, Gram-Schmidt, SVD decomposition
 - Teaching evaluations (satisfaction with teacher): 5.72 (outof 6)

Full teaching evaluations for all these courses are available on my website <http://frans.us>.

Tsinghua University, Beijing

Further, I have taught Introduction to Computer Science (two semesters) and Advanced Algorithms at Tsinghua University in Beijing, China at the Institute for Theoretical Computer Science (ITCS, it has since been renamed IIIS).

Cornell University, Summer 2004

Finally, I taught the course Engineering Applications of Operations Research at Cornell University for the first time in Summer 2004.