

# CSE 257: Search and Optimization (Winter 2025)

Instructor: Sicun Gao

## Schedule

- Week 1: Numerical Optimization (I)  
(first-order and second-order directions, line search, various accelerations)
- Week 2: Stochastic Search  
(simulated annealing, cross-entropy methods, search gradient)
- Week 3: Classical Search  
(heuristic search, adversarial search, sampling-based planning)
- Week 4: Reinforcement Learning (I)  
(MDP, value and policy iteration, temporal-difference, Q-learning)
- Week 5: Reinforcement Learning (II)  
(deep Q-learning, policy gradient, policy improvement theorems)
- Week 6: Bandits and Monte Carlo Tree Search  
(concentration bounds, upper confidence bound, MCTS, AlphaGo)
- Week 7: Combinatorial Search (I)  
(constraint programming, SAT, conflict-driven backtracking)
- Week 8: Combinatorial Search (II)  
(integer programming, cutting planes, general nonlinear problems)
- Week 9: Numerical Optimization (II)  
(further topics on constrained optimization if time permits)
- Week 10: TBA

## Grading

- Assignments: 55 Points
- Participation: 5 Points
- Final (closed-book exam): 40 Points