

16.410-13: Principles of Autonomy and Decision Making

Fall, 2004

Professors Brian Williams and Nicholas Roy

9/8: Introduction to Autonomy (BW/NR)

Part I: Foundations: Problem Solving as State Space Search

9/13: Introduction to Scheme (NR)

9/15: Problem Solving and Uninformed Search (BW)

9/20: Implementing Uninformed Search with Scheme (NR)

9/22: Analysis of Uninformed Search (BW)

Part II: Mobile Systems

Global Path Planning

9/27: Creating Roadmaps (NR)

9/29: Informed Search of Roadmaps (NR)

Dynamic Trajectory Planning

10/4: Linear Programs and Receding Horizon Control (NR)

10/6: Solving Linear Programs Through Simplex (NR)

10/11: Holiday

Visual Interpretation

10/13: Constraint Programming and Arc Consistency (BW)

10/18: Solving Constraint Programs via Inference and Search (BW)

Part III: Autonomous Operations

Activity Planning

10/20: Planning Problems and Plan Graphs (BW)

10/25: Planning and Execution with Plan Graphs (BW)

Scheduling

10/27 : Scheduling and Simple Temporal Networks (BW)

11/1 : Midterm

Part IV: Interpreting Observations (for Mobility and Operations)

Robot Localization

11/3 : Probability and Statistics (NR)

11/8 : Probabilistic State Estimation (NR)

Diagnosis

11/10 : Modeling and Propositional Logic (BW)

11/15 : Model-based Diagnosis as Conflict-directed Search (BW)

11/17 : Rule-based Diagnosis and First Order Logic (BW)

Part V: Agents that Act Optimally

11/22 : Integer Programming and Branch and Bound (BW)

11/24 : Utility-based Agents and Markov Processes (BW/NR)

11/25 : Thanksgiving Holiday

Part VI: Agents that Learn and Adapt

11/29 : Learning Theory, Decision Trees (NR)

Neural Networks

12/2 : Bayesian Classification, SVMs (NR)

12/6 : 16.413 Project Presentations (joint 16.410/13 lectures 9-12pm)

12/8 : Final Exam Review (NR)

12/13-17 Final Exam (Date To Be Assigned)