# CSE 150A Notes

# 1 9/26

## 1.1 Course Information

Prerequisites:

- Programming Knowledge
- Elementary Probability
  - Random Variables - discrete and continuous
  - Expected Values - sums and integrals
- Multivariable Calculus
- Linear Algebra

HW Released Tuesdays, due Monday 24 hr late policy for HW Quizzes in person every Thursday lecture – Based on HW Point lost on quizzes go to the Final Midterm: 10/31 (Week 5) in class Final: 12/5 (Week 10) in class One sheet of handwritten notes allowed

## 1.2 Course Overview

- Inference and learning in Bayesian Networks
- Markov decision processes for reinforcement learning

Does not cover:

- Neural architectures
- Purely logical reasoning
- Heuristic search (A*)
- Theorem proving
- Genetic algorithms
- Philosophy of AI

# 2 10/1

Probability Theory: how knowledge affects belief (Poole and Mackworth)
This view is known as the Bayesian view of probability
Other view is the frequentist view; probability is the limit of the relative frequency of an event
Discrete Random Variables: denoted with capital letters
Domain of possible values for a variable, denoted with lowercase letters
Uncoditional (prior) probability: $P(X = x)$
Axioms of Probability:
$P(X = x) \geq 0$
$\sum_{i=1}^{n} P(X = x_i) = 1$
$P(X = x_i \text{ or } X = x_j) = P(X = x_i) + P(X = x_j)$ iff $x_i \neq x_j$
Conditional Probability: $P(X = x_i | Y = y_j)$
In this case X and Y are dependent
Bayes rule: $P(X = x_i | Y = y_j) = \frac{P(Y=y_j|X=x_i)P(X=x_i)}{P(Y=y_j)}$