DECISION ANALYSIS CERTIFICATE

Program Description

As you begin framing decisions, the complexities quickly reveal that defining the problem is the problem. How do your choices in defining the problem impact your discovery of innovative solutions? This program will provide you with a framework to structure the way you think about decisions that are complicated by uncertainty, complexity, and competing objectives. Creative problem framing and the generation of decision alternatives is key when confronting highly complex and uncertain decisions.

This certificate program will provide context for how your values, objectives, and perspective can frame how you consider decisions in real-world contexts. You will create and navigate simple, discrete choices using decision trees to gain insights. With this foundation, you will dig deeper into what it means to balance the subjectivity of decision making while trying to maintain objectivity. You will investigate how biases, heuristics, risk attitudes, and other complexities add layers of consideration to your decisions. Using an optimization-based simulation, this program provides more context on decision theory that leads to modern discoveries. Bringing in real-world examples and case studies, you will explore developing alternatives and trade-offs using Monte Carlo simulations. Finally, you will gain contextual practice in a simulation environment using the simulation tool Rhodium.

As you progress in this certificate program, you will be better equipped with the concepts and tools you'll need for framing and analyzing complex decisions. By the end, you will be able to implement complex simulation tools that equip you with everything you need, from standard decision-framing tools to the most innovative options available.

You will be most successful in this program if you have an introductory knowledge of probability and statistics.

For the best experience in this program, it is recommended to take these courses in the order that they appear.

Key Takeaways

- Define the key components of your problem while considering the impact of your values, the overall objectives, and the consequences of potential solutions
- Construct and use decision trees to evaluate a discrete set of options across a range of possible events
- Expand decision framing to account for various biases, heuristics, and assumptions in utility theory
- Determine how much you are willing to pay for relevant information that aids decisions
- Use simulation-based optimization to apply possible decision alternatives and consider their trade-offs
- Design for various alternatives using Monte Carlo simulations to structure and analyze statistical experiments
- Discover how to design robust solutions by testing multiple problem formulations and exploring combinations of consequential uncertainty

What You'll Earn

- Decision Analysis Certificate from Cornell University's College of Engineering
- 70 Professional Development Hours (7 CEUS)

Who Should Enroll

- Engineers in any field, including mechanical, electrical, civil, and environmental
- Aspiring data scientists, data analysts, and market analysts
- Anyone who needs to make highly consequential decisions or inform solutions in the face of uncertainty or multiple and conflicting objectives

Total Investment

3.5 months to complete the courses.

How to Enroll

For more information and to enroll, please visit Decision Analysis Certificate (https://ecornell.cornell.edu/certificates/engineering/decision-analysis/).

Courses

Code	Title	Hours
eCornell CEEM591	Framing Decisions	0
eCornell CEEM592	Using Decision Trees	0
eCornell CEEM593	Accounting for Subjectivity and Valuing Information	0
eCornell CEEM594	Risk Attitudes and Key Assumptions in Utility Theory	0
eCornell CEEM595	Implementing Simulation-Based Optimization	0
eCornell CEEM596	Modeling Design Decisions and Performance	0
eCornell CEEM597	Designing for Resilience and Robustness	0