

Course ID	Course Description	Course Objectives
<p>ESCD 7430 Decision Analysis/Utility Theory</p>	<p>The purpose of this course is to improve the student's abilities to analyze complex and sophisticated decision analysis problems and to design models of individual preference behavior, probability and statistical decision-making. Students learn to analyze decision analysis problems by identifying objectives, alternative courses of action, consequences, likelihood of those consequences and preferred outcomes. Progressing from simple to complex, the course develops practical analytical techniques for the decision sciences researcher. Topics include decision trees, probability theory, structural modeling, Bayesian inference, multi-stage decision models, clinical decision-making, Markov Analysis, simulation, cost-effectiveness analysis, utility theory and the role of risk attitudes and preferences in decision making, and ROC Curves.</p>	<p>To more clearly understand the systematic decision analysis process and framework, the student will analyze problem sets, read textbook and other readings from assigned health services research journals and will present a review of two articles from the relevant literature. The software package TreeAge will be used to automate some of the problem solving process. Course topics will be introduced in class lecture with the learnings supported through problem-solving exercises and health services research literature readings.</p> <p>The student will be able to:</p> <ol style="list-style-type: none"> 1. Differentiate the characteristics of "structural modeling". 2. Interpret the structures and applications of decision trees and probability trees. 3. Explain how decision analysis, as a science, provides structure and benefits for the decision making process. 4. Define, construct and solve decision trees. 5. Perform and interpret sensitivity analysis. 6. Define, construct and solve probability trees. 7. Explain the fundamentals of probability theory for decision analysis and decision models (conditionality, expectation and probabilistic independence) 8. Apply Bayes' theorem and describe its role in decision analysis. 9. Describe the use of decision models in clinical decision-making, including the use of Markov Analysis and simulation. 10. Construct and solve decision analysis problems that include a Markov Analysis solved through simulation. 11. Analyze processes using Markov Analysis (using both cohort analysis and simulation). 12. Explain utility theory 13. Explain QALYs 14. Assess and draw single-attribute utility functions 15. Describe multi-criteria decision making. 16. Evaluate current health services research literature that uses decision analysis: its procedures, rationale, strengths and limitations of the studies you read. 17. Apply critical skills to appraising decision analysis literature. 18. Utilize TreeAge software to solve decision tree and Markov analysis problems.