

# IE544 Decision Analysis

## Spring 2009

**Instructor:** Taner Bilgiç ([taner@boun.edu.tr](mailto:taner@boun.edu.tr))

**Course web page:** <http://karagoz.ie.boun.edu.tr/moodle/course/view.php?id=52>

**Prerequisites:** Basic exposure to probability theory and graph theory. A course in cognitive psychology is a plus.

**Grading:** Midterm (30%), Term Project (15%), Assignments (25%), Final (30%).

### Course schedule

Wednesday	9 am-10 am	Lecture	M 1170
Thursday	1 pm-3 pm	Lecture	M 2170

### Course outline

<i>Topic</i>	<i>Week</i>
<u>Introduction</u>	1
Measurement Theory	2
Subjective Probability	3
Expected Utility	4
Dependency Models	5
Exact Inference	6-7
Complexity of Exact Inference	8
Midterm	9
Approximate Inference	10
Learning BNs	11
Influence and Decision Diagrams	12
Expected Value of Perfect Information	13
Applications: Troubleshooting	14

### References:

- Fred S. Roberts, *Measurement theory with applications to decision making, utility, and the social sciences*, Reading, Mass. : Addison-Wesley, 1979. H61 .R593 1979
- Robert G. Cowell, A. P. Dawid, S. L. Lauritzen, D. J. Spiegelhalter, *Probabilistic networks and expert systems*, New York : Springer, c1999. QA76.76.E95 P755 1999
- F.V. Jensen, *Bayesian networks and decision graphs*, New York : Springer, 2001. QA279.5 .J45 2001
- Finn V. Jensen, *An introduction to Bayesian networks*. London : UCL Press, 1996. QA279.5 .J46 1996
- Robert T. Clemen. *Making Hard Decisions: An Introduction to Decision Analysis*. 2<sup>nd</sup> edition, Duxbury Press, An Imprint of Wadsworth Publishing Company, Belmont, California, 1996, ISBN 0-534-26034-9
- Ralph L. Keeney. *Value-Focused Thinking: A Path to Creative Decision making*. Harvard University Press: Cambridge, Massachusetts, 1992, ISBN 0-674-93197-1
- Judea Pearl. *Probabilistic reasoning in intelligent systems : networks of plausible inference*, Rev. 2nd print. Imprint San Mateo, Calif. : Morgan Kaufmann Publishers, c1988.Q335 .P383 1988
- Howard Raiffa. *Decision Analysis: Introductory Lectures on Choices Under Uncertainty*. McGraw-Hill, Inc.: New York, 1968, ISBN 0-07-554866-6