

**MECS-462**  
**Decision Theory**  
**Friday's 1:00-4:00 p.m.**  
**Professor Nabil I. Al-Najjar, MEDS**

This version: *February 25, 2008*

*Description :*

This is a PhD-level course on the theory of individual decision making under uncertainty. The material covered falls into the following broad topics:

1. Classical axiomatic foundations (weeks 1-3);
2. Ambiguity (weeks 4 and 9);
3. Intertemporal choice (weeks 5-6);
4. Menu choice models (week 7)
5. Learning, complexity and testing (week 8-10);

*Required Background :*

Students should have completed the Microeconomic Theory sequence and have basic understanding of Game Theory.

*Grading :*

There will be three grading components: (1) Class participation; (2) Class presentation of one of the papers on the reading list (details may depend on the number of students enrolled); and (3) Homeworks. These requirements will be discussed in detail during the first and subsequent classes.

*Required text :*

Kreps (1988). Other readings will be posted as zip files for download form my research page/ph.d. teaching.

# Course Outline

## **Week 1:**

***Preferences and Ordinal Utility;  
von Neumann-Morgenstern Theory***

*Main reading, preferences and ordinal utility:*

Kreps, Ch. 1-3.

*Main reading, vN-M theory:*

Kreps: ch. 3, pp. 31-33, ch. 5, and ch. 6.

## **Week 2:**

***Utility Functions for Money;  
Anscombe-Aumann Theory***

*Main reading:*

Kreps, ch. 6 and 7.

## **Week 3:**

***Savage's Theory;  
Probabilistic Sophistication***

*Main readings, Savage's theory:*

Kreps, ch. 8-9; Savage (1972), ch. 1-6.

*Main reading, probabilistic sophistication:*

Machina and Schmeidler (1992).

**Week 4:**  
***Ambiguity***

*Main readings, ambiguity:*

Schmeidler (1989), Gilboa and Schmeidler (1989).

*Extensions:*

Klibanoff, Marinacci, and Mukerji (2005); Maccheroni, Marinacci, and Rustichini (2006).

**Week 5:**  
***Intertemporal Choice***

*Main readings:*

Kreps, Ch. 10; Koopmans (1960); Epstein (1983); Kreps and Porteus (1978).

*Additional readings:*

Epstein and Zin (1989).

**Week 6:**  
***Dynamic Consistency***

*Main readings, dynamic consistency:*

Machina (1989); Epstein and Le Breton (1993).

*Main readings, updating under ambiguity:*

Epstein and Schneider (2003).

**Week 7:**  
***Choice Over Menus, Temptation, and Self-Control***

*Main readings:*

Kreps, ch. 13; Dekel, Lipman, and Rustichini (2006); Dekel and Lipman (2007).

*Additional readings:*

Dekel, Lipman, and Rustichini (2001); Gul and Pesendorfer (2001).

**Week 8:**

***Learning, Updating, and de Finetti's Theorem***

*Main readings:*

Kreps, ch. 11; Freedman (1965); Diaconis and Freedman (1986); Feldman (1991).

**Week 9:**

***Minimax Regret;  
Complexity, Learning and Frequentist Methods***

*Main readings, minimax regret:*

Savage (1951); Manski (2004); Hayashi (2008).

*Main readings, complexity and learning:*

Al-Najjar (2006), Devroye, Györfi, and Lugosi (1996), Harman and Kulkarni (2007).

**Week 10:**

***Testing Knowledge and Beliefs***

*Main reading:*

Sandroni (2003); a simpler statement and motivation may be found in Section 6 of Al-Najjar and Weinstein (2008).

*Infinite horizon:*

Olszewski and Sandroni (2007); Shmaya (2007).

*Restricting beliefs:*

Al-Najjar, Sandroni, Smorodinski, and Weinstein (2007).

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