

MA417 Spring 2018

Decision Making Under Uncertainty

1 Instructor:

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2 Text

Required text: Operations Research; An Introduction by H. Taha, 8th edition (NOT the 9th edition).

I will also provide a list of additional reading material that will be posted on the class' website.

3 Grading

Your grade for the course will be based on two midterm exams, a final exam, and five homework sets.

Midterms: 100 points each, Final: 100 points, Problem Sets: 100 points

Grading scale will be based on the percentage obtained out of a total of 400 points:

A 90-100, B 80-89, C 70-79, D 60-69, E below 60.

4 Software

In this class, you will need to use one of the following (whichever you prefer) to solve some of the HW problems:

- Excel or Calc (the Open Office version of Excel). These are spreadsheet programs and you could work many of the problems using them. You might need the built-in solvers for optimization.
- Ampl: A student version of this program is available free for download from the AMPL website AMPL <http://www.ampl.com/>. This language makes it fairly easy to set up mathematical optimization models - especially linear programming models.

- R. This language is very heavily used in statistical analysis. It is the open source version of S+ and is available free for download at Cran CRAN CRAN <http://cran.r-project.org/>.
- C and Fortran: These are essentially required for solving big industrial strength problems.
- Maple, Mathematica or Matlab: If you are familiar with either one and have access to them, then they will work fine.

5 Topics and Goals

This course can be divide into two (closely related) parts:

Part I: Decisions under uncertainty

- Decision making under uncertainty without priors (class notes).
- Decisions using expected values and the value of information (class notes +Chap 12, 13 in the text)

HW 1.

- The theory of expected utility (class notes)

HW 2.

Part II: Dynamic programming

- Dynamic programming (Chap. 10 in the textbook + class notes)

HW 3.

- Inventory problems (Chap. 11,14, in the textbook)

HW 4.

- Markov chains (Chap 17 in the textbook)

HW 5.

6 Tentative Course Schedule

- Tentatively, the first midterm will be held during the week of 2/12, and the second midterm will be held during the week of the 3/26.
- The Final will be held during the time scheduled by the Registrar.

No makeup exams will be given, and no late HW will be accepted without a valid and verifiable excuse (see https://www.uky.edu/Ombud/ForFaculty_ExcusedAbsences.php for rules and regulations)

7 HW

I will assign weekly problems that you don't need to turn in (but you need to do, if you want to do well on the exams). Moreover, there will be five problem sets that will be graded and collected (see Grading). The problem sets will be posted on the course site (on Canvas). You can work on the HW problems in groups of no more than three students per group. In fact, you can turn in the HW as a group. Some sets will be longer/more difficult than others, and therefore the HW sets will not be equally weighted.