



EMSE 6020:

Decision Making with Uncertainty

Instructor Information:

Dr. J. René van Dorp

Professor

Office Address: 1776 G Street, Office 135, Washington DC 20052

Telephone Number: 202-994-6638

Fax Number: 202-994-0245

E-mail: dorpir@gmail.com

Office Hours: Tuesday 5:00PM to 6:00PM, Thursday 5:00PM to 6:00PM

Class Meets at: 1776 G Street NW, Room 168



Course Description:

In this course the concepts of how to formulate, structure, analyze, and solve complex decision problems will be studied. These concepts will make use of: (1) influence diagrams and decision trees for modeling decision problems, (2) Bayesian analysis as applied to decision analysis, (3) the concept and use of subjective probability, (4) the value of information, and finally (5) the use of probability models for solving decision problems.

Recommended Prerequisite:

Prerequisites for this course are the same as the prerequisite requirements for admission into the Masters program of the Engineering Management and Systems Engineering Department.



Students entering the course with a solid grasp of algebra, analytic geometry and knowledge of probability calculus equivalent to the level of ApSc 115 will find some of the materials in this class more accessible due to prior exposure to similar topics. Elementary probability calculus needed for this class will be discussed in an early class.

Course Objectives:

Introduce students to decision analysis approaches for complex decision problems by using decomposition; "Divide and Conquer". Introduce students to the use of expert judgment as a data source when solid data is not available. Introduce students to approaches for estimating the value (in \$) of perfect and imperfect information.



Method of Instruction:

Book: "Making Hard Decisions with Decision Tools"

By: Robert T. Clemen and Terence Reilly

Class Sessions:

Students will be assigned reading assignments which they are expected to read before class. During class the material will be presented using lecture slides. A copy of the slides may be printed from this site prior to class. Additional information may be posted for individual class sessions.



Class Attendance + Homework + Extra Problems (EP's):

Class attendance and Homework is considered to be a vital part of the course.

Homework sets will be assigned during the course. Separate Extra Problems (EP's) will be assigned as well. An electronic solution to the Extra Problem will be provided and their solution will be presented in detail in class. A selection of homework solution will be discussed during class. A complete set of homework solutions of those that were assigned will be posted on the class course page.

Students are encouraged to work together on the homework and on the Extra Problems. However, each student is required to hand in their own solution to the Extra Problems in their own words.



CLASS EXTRA PROBLEMS ARE DUE ONE WEEK AFTER THEY HAVE BEEN ASSIGNED. **HARD COPIES** OF YOUR SOLUTIONS NEED TO BE HANDED IN **AT THE START OF EACH CLASS**. **NO CREDIT WILL BE EXTRA PROBLEMS HANDED-IN AFTER THEY ARE DUE.**

FINAL GRADE CALCULATION:

5% Class Attendance (Taken at the beginning of each class)

15% Extra Problems (Will be graded on effort only)

35% Midterm Exam

45% Final Exam

The midterm exam and final exam are closed books, closed notes exams. Student may have one sheet of paper with formulas to use during these exams. This sheet



of paper may not contain any solution of a homework problem or a solution of an extra problem. **You will be asked to hand-in your formula sheet** with your midterm exam and final exam. **One of the questions on the midterm exam and the final exam will be selected out of the Extra Problem set.**



Academic Integrity:

THE ACADEMIC INTEGRITY CODE WAS DEVELOPED
BY THE STUDENTS AND THE FACULTY OF GW WORKING
TOGETHER IN 1995. BY ATTENDING GW EACH STUDENT
IS PART OF THIS TRADITION.

"THE RIGHT ANSWER COMES FROM YOU"

Cheating will not be tolerated, **i.e. copying or looking on another student's paper during the midterm exam or the final exam**, will not be tolerated. In the event of cheating action will be taken in accordance with the Academic Integrity Code. A copy of the Academic Integrity Code may be picked up at:

ACADEMIC INTEGRITY OFFICE, THE GEORGE WASHINGTON UNIVERSITY, 609 22nd
STREET, N.W. BLDG. AJ, WASHINGTON D.C. 20052



Syllabus: EMSE 6020

SESSION	DATE	DAY	TOPIC	Reading Assignments	Extra Problem Assignment	Extra Problem Due	Homework Assignment
1	5/17/11	Tuesday	Introduction to Decision Analysis	Chapter 1	EP 1		1.1, 1.6, 1.7
2	5/19/11	Thursday	Introduction to Decision Analysis	Chapter 2		EP 1	2.6, 2.7, 2.10, 2.12
3	5/24/11	Tuesday	Influence Diagrams and Decision Trees	Chapter 3	EP 2		3.9, 3.11, 3.13, 3.18, 3.20, 3.25
4	5/26/11	Thursday	Probability Calculus for Decision Analysis I	Chapter 7	EP 3	EP 2	7.3, 7.4, 7.6, 7.8, 7.9
5	5/31/11	Tuesday	Probability Calculus for Decision Analysis II	Chapter 7	EP 4	EP 3	7.15, 7.16, 7.20, 7.27, 7.32, 7.34
6	6/2/11	Thursday	Solving Decision Trees I	Chapter 4	EP 5	EP 4	4.8, 4.9, 4.14
7	6/7/11	Tuesday	Solving Decision Trees II - Sensitivity Analysis I	Chapter 4, Chapter	EP 6	EP 5	4.15, 4.16, 5.7
8	6/9/11	Thursday	Sensitivity Analysis II - Midterm Review Session	Chapter 5	EP7	EP 6	5.9, 5.11
9	6/14/11	Tuesday	MIDTERM EXAM Sessions 1 - 6, EP 1 - 6				
10	6/16/11	Thursday	Discuss Midterm Exam + Value of Information	Chapter 12	EP 8	EP 7	12.2, 12.7, 12.8
11	6/21/11	Tuesday	Subjective Probability I	Chapter 8	EP 9	EP 8	8.11, 8.15c/d, 12.13
12	6/23/11	Thursday	Subjective Probability II	Chapter 8	EP 11	EP 9	8.18, 8.20, 8.25
12	6/28/11	Tuesday	Theoretical Probability Models I	Chapter 9		EP 11	9.15, 9.21
13	6/30/11	Thursday	Theoretical Probability Models II	Chapter 9	EP 10		9.28, 9.31
14	7/5/11	Tuesday	Discuss Homework + Final Review			EP 10	
15	7/7/11	Thursday	FINAL EXAM Sessions 7, 8, 10 - 14				



- **THE SCHEDULE ABOVE IS SUBJECT TO CHANGE, PLEASE CHECK WEB-SITE REGULARLY!**
- Electronic copies of the lecture notes can be downloaded from my Faculty web-page at: <http://www.seas.gwu.edu/~dorprj/EMSE269/Intro.html>
- Please send me an introductory e-mail to dorprj@gmail.com with subject **“EMSE 6020 Summer 2011”** so I can create an E-mail Class List.