PubH 6717-001  
Decision Analysis for Health Care  
Fall 2013

Credits: 2.0  
Meeting Days: Fridays  
Meeting Time: 1:00pm – 2:50pm  
Meeting Place: Mayo D199  
Instructor: Eva A. Enns, PhD  
Office Address: 15-228 Phillips Wangensteen Building  
Office Phone: 612-626-4581  
E-mail: eenns@umn.edu  
Office Hours: Thursdays, 11am-12pm or by appointment  

Course Assistant: Fernando Alarid  
E-mail: alari006@umn.edu  
Office Hours: Wednesdays, 3-5pm in PWB 15-220  

Course Grader: Sung Choi  
E-mail: choiy001@umn.edu

I. Course Description  
This course will introduce students to the methods and growing range of applications of decision analysis and cost-effectiveness analysis in health care, public health, technology assessment, medical decision making, and health resource allocation.

II. Course Prerequisites  
None.

III. Course Goals and Objectives  
At the conclusion of this course, the student will be able to formulate and solve a decision analysis problem by specifying the relevant variables, uncertainties, and objective. The student will have an appreciation of the practical problems in applying these methods to the evaluation of various strategies and public health policies. The student will have an appreciation of the uses and limitations of these methods in decision making.
making at the individual, organizational, and policy level. The student will learn the basic principles and mechanics underlying incremental cost-effectiveness analysis.

IV. Methods of Instruction and Work Expectations

Class sessions will be lecture format with expectations of class participation. There will be a problem set that covers class material assigned most weeks that will be due the following week. It is expected that all students will keep up with the required readings and homework assignments.

V. Course Text and Readings


- Papers related to specific lecture topics will be posted on course website.

VI. Course Outline/Weekly Schedule

<table>
<thead>
<tr>
<th>Session 1</th>
<th>09/6/13</th>
<th>Introduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction to Decision Analysis / Models of Decision Making / Where is Decision Analysis Used / Motivational Cases / Elements of Decision Problems</td>
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<td></td>
</tr>
</tbody>
</table>

Reading:

Hunink MGM, Glasziou PP, et al.. Decision Making in Health and Medicine, Chapter 1.

Assignment:

Problem Set #1: Probability Review

<table>
<thead>
<tr>
<th>Session 2</th>
<th>09/13/13</th>
<th>Structuring Decisions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structuring Decision Problems under Uncertainty / Building a Decision Tree/Probabilities / Sequence of Events / Specifying Outcomes / Analysis of a Decision Tree / Value of Perfect Information</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Reading:

Hunink MGM, Glasziou PP, et al.. Decision Making in Health and Medicine, Chapters (1), 2, and 3.

Assignment:

Problem Set #2: Analyzing Decision Trees

<table>
<thead>
<tr>
<th>Session 3</th>
<th>09/20/13</th>
<th>Collecting additional information</th>
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<tbody>
<tr>
<td>Conditional probabilities revisited / Characterizing imperfect information / Sensitivity and Specificity / Likelihood ratios / Bayes’ Theorem / Bayesian updating / Prior and posterior probabilities</td>
<td></td>
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</tr>
</tbody>
</table>

Reading:

Hunink MGM, Glasziou PP, et al.. Decision Making in Health and Medicine, Chapters 5 and 6.

Assignment:

Problem Set #3: Bayes’ Theorem
<table>
<thead>
<tr>
<th>Session 4</th>
<th>9/27/13</th>
<th>Interpreting additional information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Characteristics of Tests / Probability Revision Using Likelihood Ratio and Odds / Introduction to Receiver Operating Characteristic (ROC) Curves / Choosing a Positivity Criterion for a Diagnostic Test</td>
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</tbody>
</table>

**Reading:**


**Assignment:**

Problem Set #4: Diagnostic Testing Strategies

<table>
<thead>
<tr>
<th>Session 5</th>
<th>10/04/13</th>
<th>Exploring Uncertainty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimating model parameters / Parameter uncertainty and decision-making / One- and two-way sensitivity analysis / Threshold analysis / Probabilistic sensitivity analysis</td>
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</tbody>
</table>

**Reading:**


**Assignment:**

Problem Set #5: Sensitivity Analysis

<table>
<thead>
<tr>
<th>Session 6</th>
<th>10/11/13</th>
<th>Preferences in Decision Making</th>
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</thead>
<tbody>
<tr>
<td>Measuring and Valuing Outcomes in Individuals / Eliciting Utilities / Basic Reference Gamble / Time Trade-Off / Rating Scale / Quality-adjusted life-years</td>
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</tr>
</tbody>
</table>

**Reading:**


**Assignment:**

Problem Set #6: Utility Assessment

<table>
<thead>
<tr>
<th>Session 7</th>
<th>10/18/13</th>
<th>Midterm Review</th>
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</thead>
<tbody>
<tr>
<td>Midterm Review.</td>
<td></td>
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</tbody>
</table>

**Assignment:**

Take-home midterm. Due 10/25/13.

***TAKE-HOME MIDTERM TO BE DISTRIBUTED AT END OF CLASS TODAY***
<table>
<thead>
<tr>
<th>Session</th>
<th>Date</th>
<th>Topic</th>
<th>Notes</th>
<th>Reading</th>
<th>Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td><em><strong>MIDTERM EXAM DUE IN CLASS TODAY</strong></em></td>
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</tr>
<tr>
<td>Session 12</td>
<td>11/22/13</td>
<td>Stochastic Dynamic Modeling</td>
<td>Simulation basics / Stochastic cohort models / Microsimulation models</td>
<td>Hunink MGM, Glasziou PP, et al. <em>Decision Making in Health and Medicine</em>, Chapter 11: sections 11.3.3-11.3.5</td>
<td>Problem Set #11: Stochastic modeling</td>
</tr>
</tbody>
</table>
VII. Evaluation and Grading

Grades are based on performance on
1. 11 problem sets (25% of the total grade)
2. Midterm exam (20% of the total grade)
3. Final exam (30% of the total grade)
4. Final written assignment (15% of the total grade)
5. Class participation (10% of the total grade)

No credit will be given for late problem sets (reasonable exceptions will be allowed). Students are encouraged to work on problem sets in small groups but exams must be done independently.

Problem Sets

Problem sets will be posted on the course website site. Problem sets are due on the date listed at 3pm. Please submit your homework in class or via email as a .pdf file to choiy001@umn.edu (our course grader) with “PubH6717” and the assignment number in the subject line.

No special software will be required in this class. Some homework assignments will require Microsoft Excel, which can be accessed via campus library computers. Excel files will be posted on the course website for download.

Midterm and Final exams

Both the midterm and final exams will be take-home assignments that should be completed independently. You will have a week to complete these exams. Exams are due on the dates listed at 3pm. Exams should be submitted directly to the instructor in class, at PWB 15-228 (slide under door), or via email to eenns@umn.edu as a .pdf file with “PubH6717 Exam” in the subject line.

Final written assignment

Throughout the course, you will be asked to reflect on a policy question of interest and formulate it in terms of the decision analytic framework. The final written assignment will be the culmination of your findings. It should be less than 5 pages (1.5 line spacing) and include:
- a description of the policy problem and the decision(s) to be made
- an outline of a decision tree
- a summary of the data that would be required to conduct the analysis
- commentary on the feasibility of conducting the decision analysis and/or the applicability of decision analysis to the policy question

The final written assignment should be submitted with the final exam.

**A/F letter grade will be determined by total effort as follows:**

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+</td>
<td>97-100%</td>
<td>(4.0) Represents achievement that is outstanding relative to the level necessary to meet course requirements</td>
</tr>
<tr>
<td>A</td>
<td>93-96%</td>
<td>Represents achievement that is significantly above the level necessary to meet course requirements</td>
</tr>
<tr>
<td>A-</td>
<td>90-92%</td>
<td>Represents achievement that meets the minimum course requirements</td>
</tr>
<tr>
<td>B+</td>
<td>87-89%</td>
<td>Represents achievement that meets the minimum course requirements</td>
</tr>
<tr>
<td>B</td>
<td>83-86%</td>
<td>Represents achievement below minimum course expectations but sufficient to be awarded credit</td>
</tr>
<tr>
<td>B-</td>
<td>80-82%</td>
<td>Represents failure (no credit) and signifies that the work was either (1) completed at a level of achievement that is not worthy of credit or (2) was not completed and there was no agreement between the instructor and the student that the student would be awarded an I</td>
</tr>
<tr>
<td>C+</td>
<td>77-79%</td>
<td>Represents failure (no credit) and signifies that the work was either (1) completed at a level of achievement that is not worthy of credit or (2) was not completed and there was no agreement between the instructor and the student that the student would be awarded an I</td>
</tr>
<tr>
<td>C</td>
<td>73-76%</td>
<td>Represents failure (no credit) and signifies that the work was either (1) completed at a level of achievement that is not worthy of credit or (2) was not completed and there was no agreement between the instructor and the student that the student would be awarded an I</td>
</tr>
<tr>
<td>C-</td>
<td>70-72%</td>
<td>Represents failure (no credit) and signifies that the work was either (1) completed at a level of achievement that is not worthy of credit or (2) was not completed and there was no agreement between the instructor and the student that the student would be awarded an I</td>
</tr>
<tr>
<td>D+</td>
<td>67-69%</td>
<td>Represents failure (no credit) and signifies that the work was either (1) completed at a level of achievement that is not worthy of credit or (2) was not completed and there was no agreement between the instructor and the student that the student would be awarded an I</td>
</tr>
<tr>
<td>D</td>
<td>63-66%</td>
<td>Represents failure (no credit) and signifies that the work was either (1) completed at a level of achievement that is not worthy of credit or (2) was not completed and there was no agreement between the instructor and the student that the student would be awarded an I</td>
</tr>
<tr>
<td>D-</td>
<td>60-62%</td>
<td>Represents failure (no credit) and signifies that the work was either (1) completed at a level of achievement that is not worthy of credit or (2) was not completed and there was no agreement between the instructor and the student that the student would be awarded an I</td>
</tr>
<tr>
<td>F</td>
<td>below 60%</td>
<td>Represents failure (no credit) and signifies that the work was either (1) completed at a level of achievement that is not worthy of credit or (2) was not completed and there was no agreement between the instructor and the student that the student would be awarded an I</td>
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</table>

S/N option must complete all assignments to a C- level (70%):

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>S</td>
<td>Achievement that is satisfactory will be expected to complete all assignments and receive a minimum of 70% to receive a passing score (achievement required for an S is at the discretion of the instructor but may be no lower than a 70%).</td>
</tr>
<tr>
<td>F</td>
<td>Represents failure (or no credit) and signifies that the work was either (1) completed but at a level of achievement that is not worthy of credit or (2) was not completed and there was no agreement between the instructor and the student that the student would be awarded an I.</td>
</tr>
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**Course Evaluation**

Beginning in fall 2008, the SPH will collect student course evaluations electronically using a software system called CoursEval: [www.sph.umn.edu/courseval](http://www.sph.umn.edu/courseval). The system will send email notifications to students when they can access and complete their course evaluations. Students who complete their course evaluations promptly will be able to access their final grades just as soon as the faculty member renders the grade in SPHGrades: [www.sph.umn.edu/grades](http://www.sph.umn.edu/grades). All students will have access to their final grades through OneStop two weeks after the last day of the semester regardless of whether they completed their course evaluation or not. Student feedback on course content and faculty teaching skills are an important means for improving our work. Please take the time to complete a course evaluation for each of the courses for which you are registered.

**Incomplete Contracts**

A grade of incomplete “I” shall be assigned at the discretion of the instructor when, due to extraordinary circumstances (e.g., documented illness or hospitalization, death in family, etc.), the student was prevented from completing the work of the course on time. The assignment of an “I” requires that a contract be initiated and completed by the student before the last official day of class, and signed by both the student and
instructor. If an incomplete is deemed appropriate by the instructor, the student in consultation with the instructor, will specify the time and manner in which the student will complete course requirements. Extension for completion of the work will not exceed one year (or earlier if designated by the student’s college). For more information and to initiate an incomplete contract, students should go to SPHGrades at: www.sph.umn.edu/grades.

University of Minnesota Uniform Grading and Transcript Policy - A link to the policy can be found at onestop.umn.edu.

VIII. Other Course Information and Policies

Grade Option Change (if applicable)
For full-semester courses, students may change their grade option, if applicable, through the second week of the semester. Grade option change deadlines for other terms (i.e. summer and half-semester courses) can be found at onestop.umn.edu.

Course Withdrawal
Students should refer to the Refund and Drop/Add Deadlines for the particular term at onestop.umn.edu for information and deadlines for withdrawing from a course. As a courtesy, students should notify their instructor and, if applicable, advisor of their intent to withdraw.

Students wishing to withdraw from a course after the noted final deadline for a particular term must contact the School of Public Health Office of Admissions and Student Resources at sph-ssc@umn.edu for further information.

Student Conduct Code
The University seeks an environment that promotes academic achievement and integrity, that is protective of free inquiry, and that serves the educational mission of the University. Similarly, the University seeks a community that is free from violence, threats, and intimidation; that is respectful of the rights, opportunities, and welfare of students, faculty, staff, and guests of the University; and that does not threaten the physical or mental health or safety of members of the University community.

As a student at the University you are expected adhere to Board of Regents Policy: Student Conduct Code. To review the Student Conduct Code, please see:

Note that the conduct code specifically addresses disruptive classroom conduct, which means "engaging in behavior that substantially or repeatedly interrupts either the instructor's ability to teach or student learning. The classroom extends to any setting where a student is engaged in work toward academic credit or satisfaction of program-based requirements or related activities."

Use of Personal Electronic Devices in the Classroom
Using personal electronic devices in the classroom setting can hinder instruction and learning, not only for the student using the device but also for other students in the class. To this end, the University establishes the right of each faculty member to determine if and how personal electronic devices are allowed to be used in the classroom. For complete information, please reference:

Scholastic Dishonesty
You are expected to do your own academic work and cite sources as necessary. Failing to do so is scholastic dishonesty. Scholastic dishonesty means plagiarizing; cheating on assignments or examinations; engaging in unauthorized collaboration on academic work; taking, acquiring, or using test materials without faculty permission; submitting false or incomplete records of academic achievement; acting alone or in cooperation with another to falsify records or to obtain dishonestly grades, honors, awards, or professional endorsement; altering, forging, or misusing a University academic record; or fabricating or falsifying data, research procedures, or data analysis. (Student Conduct Code:}
http://regents.umn.edu/sites/default/files/policies/Student_Conduct_Code.pdf) If it is determined that a student has cheated, he or she may be given an "F" or an "N" for the course, and may face additional sanctions from the University. For additional information, please see: http://policy.umn.edu/Policies/Education/Education/INSTRUCTORRESP.html.

The Office for Student Conduct and Academic Integrity has compiled a useful list of Frequently Asked Questions pertaining to scholastic dishonesty: http://www1.umn.edu/oscai/integrity/student/index.html. If you have additional questions, please clarify with your instructor for the course. Your instructor can respond to your specific questions regarding what would constitute scholastic dishonesty in the context of a particular class—e.g., whether collaboration on assignments is permitted, requirements and methods for citing sources, if electronic aids are permitted or prohibited during an exam.

**Makeup Work for Legitimate Absences**

Students will not be penalized for absence during the semester due to unavoidable or legitimate circumstances. Such circumstances include verified illness, participation in intercollegiate athletic events, subpoenas, jury duty, military service, bereavement, and religious observances. Such circumstances do not include voting in local, state, or national elections. For complete information, please see: http://policy.umn.edu/Policies/Education/Education/MAKEUPWORK.html.

**Appropriate Student Use of Class Notes and Course Materials**

Taking notes is a means of recording information but more importantly of personally absorbing and integrating the educational experience. However, broadly disseminating class notes beyond the classroom community or accepting compensation for taking and distributing classroom notes undermines instructor interests in their intellectual work product while not substantially furthering instructor and student interests in effective learning. Such actions violate shared norms and standards of the academic community. For additional information, please see: http://policy.umn.edu/Policies/Education/Education/STUDENTRESP.html.

**Sexual Harassment**

"Sexual harassment" means unwelcome sexual advances, requests for sexual favors, and/or other verbal or physical conduct of a sexual nature. Such conduct has the purpose or effect of unreasonably interfering with an individual's work or academic performance or creating an intimidating, hostile, or offensive working or academic environment in any University activity or program. Such behavior is not acceptable in the University setting. For additional information, please consult Board of Regents Policy: http://regents.umn.edu/sites/default/files/policies/SexHarassment.pdf.

**Equity, Diversity, Equal Opportunity, and Affirmative Action**

The University will provide equal access to and opportunity in its programs and facilities, without regard to race, color, creed, religion, national origin, gender, age, marital status, disability, public assistance status, veteran status, sexual orientation, gender identity, or gender expression. For more information, please consult Board of Regents Policy: http://regents.umn.edu/sites/default/files/policies/Equity_Diversity_EO_AA.pdf.

**Disability Accommodations**

The University of Minnesota is committed to providing equitable access to learning opportunities for all students. Disability Services (DS) is the campus office that collaborates with students who have disabilities to provide and/or arrange reasonable accommodations.

If you have, or think you may have, a disability (e.g., mental health, attentional, learning, chronic health, sensory, or physical), please contact DS at 612-626-1333 to arrange a confidential discussion regarding equitable access and reasonable accommodations.

If you are registered with DS and have a current letter requesting reasonable accommodations, please contact your instructor as early in the semester as possible to discuss how the accommodations will be applied in the course.

For more information, please see the DS website, https://diversity.umn.edu/disability/.

**Mental Health and Stress Management**
As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance and may reduce your ability to participate in daily activities. University of Minnesota services are available to assist you. You can learn more about the broad range of confidential mental health services available on campus via the Student Mental Health Website: http://www.mentalhealth.umn.edu.

**Academic Freedom and Responsibility: for courses that do not involve students in research**

Academic freedom is a cornerstone of the University. Within the scope and content of the course as defined by the instructor, it includes the freedom to discuss relevant matters in the classroom. Along with this freedom comes responsibility. Students are encouraged to develop the capacity for critical judgment and to engage in a sustained and independent search for truth. Students are free to take reasoned exception to the views offered in any course of study and to reserve judgment about matters of opinion, but they are responsible for learning the content of any course of study for which they are enrolled.*

Reports of concerns about academic freedom are taken seriously, and there are individuals and offices available for help. Contact the instructor, your Department Chair, your adviser, the associate dean of the college, or the Vice Provost for Faculty and Academic Affairs in the Office of the Provost.

*Language adapted from the American Association of University Professors “Joint Statement on Rights and Freedoms of Students”.*