Stony Brook University

Department of Technology & Society
EST581 Heuristics and Quantitative Decision Making
Prerequisites: Graduate student in Technology and Society or permission from instructor
Fall 2019
Computer Science 1310
Thursdays 7-10pm

Instructor: Dr. Krista Thyberg
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Office Hours: Wednesday 11:30-2:30, By Appointment
Office Location: Computer Science 1428

Course Description:
Complex problems (choices) need to be resolved in the course of socio-technical processes. Quantitative decision-making techniques have been evolved to address these situations. We will investigate a number of these techniques in detail, in order to understand the advantages that can be gained by using them. We will also discuss common criticisms and issues associated with these methods, and consider the heuristic methods that are often used instead to resolve complicated problems.

Learning Objectives:
- Ability to apply different decision heuristics to make decisions
- Ability to work with a team to accomplish a goal
- Ability to write a clear paper (at the graduate level) to communicate complicated ideas
- Understand basic probability models and how they impact decision making
- Confidence to discuss complex analytical issues with a diverse group of stakeholders
- Basic understanding of human psychology and the way it affects decision-making

Class Readings:
Goodwin, P., and G. Wright. 2014. *Decision Analysis for Management Judgment*. 5th Ed. Wiley.com. ISBN: 978-1-118-74073-6.
Kahneman, D. 2011. *Thinking, Fast and Slow*. Farrar, Straus, and Giroux, New York, NY. ISBN 978-0-374-53355-7.

Grading:

Participation and Attendance:	10%
Assignments:	30%
Project (presentation & paper):	30%
Exam:	30%

Grades
A: 94-100
A-:90-93
B+:87-89
B: 83-86
B-:80-82
C+:77-79
C: 73-76
C-:70-72
F: Less than 70

Semester Schedule:

Fall 2019 Dates*

Week	Date	Topic	Textbook Chapters	*Thinking, Fast and Slow* Chapters	Assignment Due
1	8/29	Class Overview Introduction to Complicated Decision Making	1, 2		
2	9/5	What are Heuristics? Heuristics: Biases and Examples	2, 10		
3	9/12	Multi-Criteria Decision Analysis (MCDA) Weighted Sum Model	3	Intro, 1, 2	Assignment 1
4	9/19	Decisions Involving Multiple Objectives: SMART	3	3, 4	Project Assignment 1
5	9/26	Decisions Involving Multiple Objectives Part 2: SMARTER, Even Swaps	4	7	Assignment 2
6	10/3	Decisions Involving Multiple Objectives Part 2: AHP	4	8, 9	Assignment 3
7	10/10	Probability	5	10, 11, 12, 13, 14, 15, 16, 17, 18	Project Assignment 2
8	10/17	Decision Making Under Uncertainty: Expected Value	6	19, 21	Assignment 4
9	10/24	Decision Making Under Uncertainty Part 2: Utility	6	22	Assignment 5
10	10/31	Decision Making Under Uncertainty Part 3: Decision Trees Key Considerations for Decision Making	7	23, 24	Project Assignment 3
11	11/7	Decisions Involving Risk Phases of Decision Making Exam Review	12	25, 26	Assignment 6
12	11/14	Exam			
13	11/21	Presentations and Class Discussions		30, 34, Conclusion	
14	11/28	**Thanksgiving Break NO CLASS**			
15	12/5	Presentations and Class Discussions, Wrap Up			**FINAL PAPER DUE**

*subject to change

Participation and Attendance:
Participation grades will be based upon observations of student work in classroom exercises, in-class assignments, participation in class discussions, and class attendance.

Homework Assignments:
Homework assignments will be assigned most weeks. Assignments are due before the start of class the following week (7:00pm) and must be submitted electronically on Blackboard (unless otherwise noted).

Late submissions will be penalized as follows:
Up to 3 days late: 40% off
4 or more days late: 50% off

In addition to weekly assignments, students will be expected to read supplemental materials which are assigned. Students will also be required to read the book *Thinking, Fast and Slow* by D. Kahneman during the semester. A reading schedule will be posted at the start of the semester and readings from the book will be required most weeks. We will have in-class discussions on reading assignments.

Project (Paper and Presentation):
Students will complete a project using a decision making technique taught in the course. The project will consist of 3 project assignments, a short analytical paper, and an in-class presentation. There will be multiple in-class work sessions so that students can work on the projects.

Exam:
There will be 1 in-class exam. The exam will be open book which means students may use the textbook, *Thinking, Fast and Slow* book, and all course materials posted on Blackboard. It will require students to show mastery of the quantitative techniques taught throughout the semester, including interpretation of the techniques. The exam will include materials taught in lecture, concepts from homework assignments, as well as information from the *Thinking, Fast and Slow* book.

Student Accessibility Support Center Statement
If you have a physical, psychological, medical or learning disability that may impact your course work, please contact Student Accessibility Support Center, ECC (Educational Communications Center) Building, Room 128, (631)632-6748. They will determine with you what accommodations, if any, are necessary and appropriate. All information and documentation is confidential.

Students who require assistance during emergency evacuation are encouraged to discuss their needs with their professors and Student Accessibility Support Center. For procedures and information go to the following website: http://www.stonybrook.edu/ehs/fire/disabilities.

Academy Integrity Statement
Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Faculty is required to report any suspected instances of academic dishonesty to the Academic Judiciary. Faculty in the Health Sciences Center (School of Health Technology & Management, Nursing, Social Welfare, Dental Medicine) and School of Medicine are required to follow their school-specific procedures. For more comprehensive information on academic integrity, including categories of academic dishonesty please refer to the academic judiciary website at http://www.stonybrook.edu/commcms/academic_integrity/index.html

Critical Incident Management
Stony Brook University expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of University Community Standards any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn. Faculty in the HSC Schools and the School of Medicine are required to follow their school-specific procedures. Further information about most academic matters can be found in the Undergraduate Bulletin, the Undergraduate Class Schedule, and the Faculty-Employee Handbook.