

FISH 507/SOE 592 – Introduction to Structured Decision Making

Credits: FISH 507 (UW students) – 3 credits, SOE 592 (WSU students) – 2 credits

Winter 2023 (UW)/Spring 2023 (WSU)

1. Description

Managing natural resources requires making decisions; in fact, one of the hardest parts of management is deciding what to do to improve conditions for natural resources and the people who rely on them. Decision science is a broad field of inquiry that focuses on both how people make decisions in practice (descriptive decision science) and how people can make decisions more effectively (normative decision science). The application of decision science, known as decision analysis or structured decision making (SDM), offers both a philosophy regarding how to think through decisions and a vast set of tools for framing, structuring, solving, implementing, and revisiting decisions. Increasingly, SDM is a vital part of natural resource management, with agencies using SDM to guide a wide variety of decisions at a range of spatiotemporal scales. This course will provide students with an understanding of the fundamentals of SDM, and will take a deeper dive into a variety of topics, including predictive modeling, multiple objective tradeoffs, risk, value of information, and dynamic or adaptive decisions.

2. Prerequisites: none

3. Course Fees: There are no course fees, but UW students will need to cover their room and board in Pullman for the workshop. Sarah will provide as much help as possible with the logistics.

4. Learning Objectives

By the end of this course, students should be able to:

1. Understand the major steps in the decision-making process – captured in the acronym PrOACT – and be able to develop a basic framing of natural resource decisions using these steps.
2. Understand the use of a variety of critical tools in decision making, including predictive modeling, multiple objective tradeoffs, risk, value of information, and dynamic or adaptive decisions.
3. Apply decision analysis in the context of their own research to help them think more clearly about the ways in which their research can inform decisions.

5. Course Instructor

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6. Meeting Times, Location, and Office Hours

- Workshop: January 3-7, 9:00 – 17:00, Troy 309, WSU Campus, Pullman
- Wednesdays, January 11-March 8, 1-2:20 on <https://washington.zoom.us/j/91090803347>
(OR ALTERNATE TIME BY MUTUAL AGREEMENT OF PARTICIPANTS)
- Sarah’s office hours: by appointment (please email so we can schedule a time to meet)

7. Textbook and Readings

- I will assign readings weekly. Please consult the GitHub site.

8. Technology

I will provide all course materials on GitHub, which can be accessed by students at both campuses. The course website is: https://github.com/conversesj/UW-WSU_Introduction_to_Structured_Decision_Making.

For our workshop week in Pullman, be sure to bring a laptop with you. You should have both Excel and R installed.

9. Teaching Methodology

In-class Lecture: Course meetings, both during the 1-week workshop and subsequent meetings, will consist of a mix of lectures, discussion, and exercises. I will provide lots of time for in-class discussion and group work, particularly during the 1-week workshop. I encourage course participants to work together both inside and outside class to discuss the material and work on homework or projects collaboratively.

Homework: I will develop 4 homework problem sets for you to complete over the course of the quarter. These will be designed to help you practice what we have discussed in class. I will drop the homework with the lowest grade before calculating your final course grade.

Final Project: Each course participant will develop a decision framework relevant to their research setting. This will require thinking through a decision framework that is likely to be relevant to a decision maker in your research context. In addition to writing a short report describing the framework, you will give a short presentation in class. I will provide more details as the course proceeds.

8. Coursework and Grades

Course Participation	35%
Homework	35%
Final Project	30%
TOTAL	100%

At UW, **final grades** will be converted from a percentage to a grade based on the chart below.

100-98%	97-96%	95-94%	93-92%	91%	90-89%	88-87%	86%	85%
4.0	3.9	3.8	3.7	3.6	3.5	3.4	3.3	3.2
84%	83%	82%	81%	80%	79%	78%	77%	76%
3.1	3.0	2.9	2.8	2.7	2.6	2.5	2.4	2.3
75%	74%	73%	72%	71%	70%	69-0%		
2.2	2.1	2.0	1.9	1.8	1.7	0.0		

At WSU, **final grades** will be converted from a percentage to a grade based on the chart below.

100-95%	94-90%	89-86%	85-83%	82-80%	79-76%
A	A-	B+	B	B-	C+
75-73%	72-70%	69-66%	65-60%	59-0%	
C	C-	D+	D	F	

9. Inclusivity

The University of Washington supports an inclusive learning environment where diverse perspectives are recognized, respected, and seen as a source of strength. In this course, we will strive to create welcoming spaces where everyone feels included and engaged regardless of their social and cultural backgrounds.

10. Policy on Missed Work and Excused Absences

Completing homeworks and the final project on time is required. Your lowest homework score will be dropped, which you can fall back on if you have to miss a due date. You are expected to attend weekly course meetings in addition to the 1-week workshop, but 1 absence from weekly meetings will not influence your participation grade. However, you should notify me of anticipated absences as early as possible.

11. Accommodations

Disability Accommodations

It is the policy and practice of the University of Washington to create accessible learning environments consistent with federal and state law, including establishing reasonable accommodations for all students. If you have already established accommodations with Disability Resources for Students (DRS), please activate your accommodations via myDRS so that we can discuss how they will be implemented in this course.

If you have not yet established services through DRS, and you have a temporary health condition or permanent disability that requires accommodations, contact DRS directly (disability.uw.edu) to set up an Access Plan. DRS facilitates the interactive process that establishes reasonable accommodations. Conditions requiring accommodation include but are not limited to mental health, attention-related, learning, vision, hearing, physical or health impacts.

In assessing whether you require reasonable accommodations through DRS, please note that full participation in this course requires the following types of engagement:

1. The ability to attend 2 2-hour lecture and hands-on sessions each week.
2. The ability to complete online quizzes.
3. The ability to complete take-home exams.

Religious Accommodations

Washington state law requires that UW develop a policy for accommodation of student absences or significant hardship due to reasons of faith or conscience, or for organized religious activities. The UW's policy, including more information about how to request an accommodation, is available at [Religious Accommodations Policy](#). Accommodations must be requested within the first two weeks of this course using the [Religious Accommodations Request form](#)

12. Academic Integrity

We expect graduate students to adopt the strict academic integrity standards of professional scientists as well as to adhere to the University Student Conduct Code. This requires that your work reflects your own intellectual efforts. Presenting someone else's work as your own represents academic misconduct, as does assisting someone else in committing academic misconduct. The [Student Conduct Code](#) defines prohibited conduct and describes how the University holds students accountable ([WAC 478-121](#)). All suspected cases of academic misconduct will be handled according to University regulations.

In this course, it is critical that you:

1. Cite any literature that informs your responses on your homeworks or project. I reserve the right to deduct some or all points if sources are not cited.
2. Work collaboratively, but pull your own weight in collaborative work.

14. Safety

Call SafeCampus at 206-685-7233 anytime – no matter where you work or study – to anonymously discuss safety and well-being concerns for yourself or others. SafeCampus's team of caring professionals will provide individualized support, while discussing short- and long-term solutions and connecting you with additional resources when requested.

15. Schedule (subject to change and refinement*)

Week	Day	Date	Topic
1	Tu-Sa	Jan 3-7	<i>See detailed workshop schedule</i>
2	W	Jan 11	In depth: Predictive modeling
3	W	Jan 18	In depth: Multiple objectives
4	W	Jan 25	<i>No Class</i>
5	W	Feb 1	In depth: Risk
6	W	Feb 8	In depth: Knowledge gaps
7	W	Feb 15	In depth: Dynamic and adaptive management
8	W	Feb 22	<i>No Class</i>

9	W	Mar 1	Final project presentations
10	W	Mar 8	Final project presentations

Detailed Workshop Schedule

Tuesday – PrOACT

Time	Topic
09:00-09:45	Welcome and Introductions
09:45-10:45	Module 1: Human Decision Making
10:45-11:00	Break
11:00-12:00	Module 2: Normative Decision Making
12:00-13:00	Lunch
13:00-13:45	Module 3: A PrOACT Story
13:45-14:45	Module 4: Problem Framing
14:45-15:00	Break
15:00-15:45	Skill Check #1
15:45-16:15	Skill Check Discussion
16:15-17:00	Work Time – Project

Wednesday – PrOACT

09:00-09:30	Insights and Discussion
09:30-10:30	Module 5: Objectives
10:30-10:45	Break
10:45-11:45	Skill Check #2
11:45-12:00	Skill Check Discussion
12:00-13:00	Lunch
13:00-14:00	Module 6: Alternatives
14:00-14:45	Skill Check #3
14:45-15:15	Skill Check Discussion
15:15-15:30	Break
15:30-17:00	Work Time – Project

Thursday – Decision classes

09:00-09:30	Insights and Discussion
09:30-10:30	Module 7: Consequences
10:30-10:45	Break
10:45-11:30	Skill Check #4
11:30-12:00	Skill Check Discussion
12:00-13:00	Lunch
13:00-13:45	Module 8: Decision Classes
13:45-15:15	Module 9: Multiple Objective Problems
15:15-15:30	Break
15:30-16:30	Skill Check #5
15:30-17:00	Work Time – Project

Friday – Decision classes

09:00-09:30	Insights and Discussion
09:30-10:15	Module 10: Portfolio Problems
10:15-10:30	Break
10:30-11:30	Module 11: Risk Problems
11:30-12:00	Work Time – Project
12:00-13:00	Lunch
13:00-13:45	Module 12: Information Problems
13:45-14:30	Module 13: Dynamic Problems
14:30-14:45	Break
14:45-15:45	Skill Check #6
15:45-16:15	Skill Check Discussion
16:15-17:00	Work Time – Project

Saturday – Sharing

09:00-09:30	Module 14: Process
09:30-10:00	Module 15: Myths, Misunderstandings and Misuses of SDM Debunked
10:00-10:15	Break
10:15-11:15	Work Time – Project
11:30-12:00	Course Closeout/Skill Check #7
