

# Course Syllabus – ESI 6346

Decision Making Under Uncertainty, OEM 2022

## Course Information

The goal of this course is to give an overview of fundamental ideas and results about rational decision making under uncertainty, highlighting the implications of these results in a variety of application areas. Topics covered include fundamentals of probability, utility theory, decision trees, Markov chains, queuing analysis, and sequential decision making in uncertain environments.

## Instructor

Dr. Alexander Semenov. [asemenov@ufl.edu](mailto:asemenov@ufl.edu)

Office hours: Saturday 10AM – 11 AM, Sunday 10AM – 11AM

More office hours are available by appointment.

## Teaching Assistant

Haolan Zheng. [haolan.zheng@ufl.edu](mailto:haolan.zheng@ufl.edu)

Office hours:

Monday 8PM – 9PM

Thursday 8PM – 9PM

## Course Materials

- Recommended textbook
  - o Title: Operations Research: Applications and Algorithms, 4th edition
  - o Author: Wayne Winston
  - o Cengage Learning; 4th edition
  - o ISBN: 978-0534380588
- Optional textbook
  - o Title: Decision Theory: Principles and Approaches
  - o Authors: Giovanni Parmigiani, Lurdes Inoue
  - o Wiley series
  - o ISBN: 978-0-471-49657-1
- Lecture materials will be made available after each lecture

## Course Schedule

This is a tentative outline, and the instructor reserves the right to make changes depending on the pace of the class.

Month	Date	Topic
December	Sunday 12/06/20 1PM-5PM	<ul style="list-style-type: none"><li>- Basic rules of probability</li><li>- Conditional Probability</li><li>- Bayes' Rule</li><li>- Random variables</li><li>- Probability distributions</li></ul>

January	Saturday 01/09/21 8AM-noon	- Expected Utility Theory - Expected Utility Principle - Decision Trees - Value of Information
	Sunday 01/10/21 1PM-5PM	- Markov Chain Models - Transition Probability - Steady State Distributions - First Passage Times
February	Saturday 02/06/21 8AM-noon	Midterm Exam & Project Proposal
	Sunday 02/07/21 1PM-5PM	- Queuing systems examples - Arrival and service processes - Birth and death processes - Queuing systems
March	Saturday 03/06/21 8AM-noon	- Newsvendor Model - Multi Armed Bandit models - Markov Decision Processes
	Sunday 03/07/21 1PM-5PM	Project Presentation
April	Saturday 04/10/21 8AM-noon	- A Simulation Approach to DMUU - Final Exam

## Grading

The grade breakdown is as follows:

Grade Category	Percentage
Homework	20%
<u>Project</u>	
Proposal	5%
Presentation	10%
Report	15%
Midterm Exam	20%
Final Exam	30%
Total	100%

Letter	Range (%)
A	90 – 100
A-	85 – 89
B+	80 – 84
B	75 – 79
B-	70 – 74
C+	65 – 69
C	60 – 64
C-	50 – 59
D+	40 – 49
D	30 – 39
E	<30

## Homework Assignments

- **All homework assignments are due by the time listed on the Canvas.**
  - All late submissions are subject to the following deduction: two (2) days late for 10% penalty; three (3) for 30% penalty; and four (4) for 60% penalty. **No submission will be accepted after 4 days past its due date.**
  - Everyone is subject to one late submission (one week) without deductions

- No information regarding homework solutions may be shared by students except at a conceptual level. Any submitted homework assignments that are identical (or nearly so), either to each other, or to a solution key will receive a credit of zero.
- Grade reviews must be requested within one week of a grade being posted. After this one-week period, no grade will be revisited.

### Exams

- A make-up exam will not be offered except in extenuating circumstances. For make-up consideration students will be required to submit documentation from a reputable source as evidence. For any planned event, the student is expected to contact the instructor no less than two weeks in advance for consideration. Please note that there is no guarantee that requests will be accommodated.

### Expectations for the Class

Students are expected adhere to the following guidelines in this course:

Take advantage of office hours. In-depth discussion about academic topics is often better handled during office hours. For homework related questions, please post them on the course discussion forum in Canvas or come to the office hours. The TA and instructor will try to answer questions in chat, but the best way to get personalized help is to go to office hours.

Students should not distract others in class.

### Student Assistance

Students experiencing crises or personal problems that interfere with their general well-being are encouraged to utilize the university's counseling resources. The Counseling & Wellness Center provides confidential counseling services at no cost for currently enrolled students. Resources are available for students having personal problems or lacking clear career or academic goals, which interfere with their academic performance. For more information, please visit <https://counseling.ufl.edu/resources/> UF also has an initiative called "U Matter, We Care," which is housed in the Dean of Students Office, but is a collaborative effort across the entire UF community, and is aimed at empowering students, providing support, and connecting students to a wide variety of resources for academic success and overall well-being. Learn more at: <https://umatter.ufl.edu/>

### Software Use Policy

All faculty, staff and student of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.