

ESI 6346: Decision Making Under Uncertainty

OEM Class 2018

SECTION 1: INFORMATION ABOUT THE CLASS

COURSE DESCRIPTION:

This course deals with quantitative models for making decisions in environments that involve uncertainty; covers fundamentals of probability and stochastic analysis, Markov chain, queuing analysis, simulation modeling, and decision trees.

CLASS SCHEDULE & LOCATION:

The class will meet on the following dates:

- **December 4th**, 2016 (from 8 am - noon)
- **January 7th**, 2017 (from 8 am - noon; 1 pm - 5 pm)
- **February 11th**, 2017 (from 8 am - noon), **February 12th**, 2017 (from 1 pm - 5 pm)
- **March 11th**, 2017 (from 8 am - noon)- **March 12th**, 2017 (from 1 pm - 5 pm)
- **April 22**, 2017 (from 8 am - noon)

SECTION 2: LEARNING SUPPORT

STAFF:

INSTRUCTOR	TEACHING ASSISTANT
Dr. Sepehr Nemati Proon E-mail: snematiproon@ufl.edu	Roshanak Mohammadivojdan E-mail: rmohammadivojdan@ufl.edu

GETTING HELP:

My goal in this class is to give you the best possible learning experience about stochastic models in Operations Research. Please feel free to contact me when you have problems with the material or concern about practical aspects of the class. The TA is also committed to make your learning experience as good as possible. You can receive help in one of the following manners:

During Class: The best moment to ask a question about something you do not understand is during class. If you experience a problem, it is likely that other students experience the same problem. However, if you prefer not to ask your question in the class, you have the following options.

E-mail: In most cases, your questions may require brief answers without very long explanations. In this case, you can send your question via E-mail, while you clearly mention the question. I am committed to answer your emails shortly.

Appointments: You can always schedule a chat/phone appointment with me. Please make sure to arrange your appointments by email including the time slots you may be available. Please note that the more flexible the time slots you give, the quicker you will receive help.

COMMUNICATIONS / E-LEARNING

All communications relative to the course will be made on E-learning. When possible, these announcements will be reiterated in class. Students are therefore responsible to check E-learning regularly for possible updates. Syllabus and supporting material will also be available on E-learning, in particular, the slides will be available before the class.

TEXTBOOK:

Wayne L. Winston, Introduction to Probability Models, Duxbury Press, 2003.

SECTION 3: CLASS TOPICS

A tentative list of topics for the class is given next. The list might be shortened or lengthened depending on the pace of the class.

Chapter 1: Review of Probability (December 2016)

Basic rules of probability – Bayes' Rule – Random variables, mean, variance and covariance – Normal distribution – Central limit Theorem.

Chapter 2: Simulation (January 2017)

Simulation basics: Terminology, Discrete-event simulation, Random number generators, Statistical analysis, Simulation using excel (example)

Chapter 3: Markov Chains (February 2017)

Stochastic processes, Introduction to Markov chains, Transition probabilities, Classification of states, Steady state probabilities, Absorbing chains

Chapter 4: Queuing Theory (February 2017)

Terminology, Arrival and service processes, Birth and death processes, Queuing systems

Chapter 5: Decision Making under Uncertainty (March 2017)

Motivation, Decision Criteria, Utility theory, Decision trees

Chapter 6: Optimization under Uncertainty (March 2017)

Probabilistic dynamic programming: Applications, formulation, Markov decision processes (MDPs)

SECTION 4: GRADINGS

1) GRADES COMPOSITION

Your grade in this class will be based on three different sources of evaluation that are weighted differently:

- | | |
|------------------------|-----|
| a. Homework (average): | 35% |
| b. Project: | 25% |
| c. Final Exam: | 40% |

2) HOMEWORK

General: Homework will be assigned regularly. The assignment with the lowest grade will be excluded when computing your homework grades. You will receive solutions to all the homework sets, typically one week after the submission due date.

Late Homework: Late homework will be accepted with a grade deduction proportional to their lateness up until the solutions are posted. (upto -1.5%/ 4 hour)

Content: The questions will range from theoretical to practical aspects. Some will be simple applications of material seen in class, some will be challenging. You may need to use computer software in some questions in which case you will be notified.

Presentation: All submitted assignments should be neat, organized, and legible. Homework not meeting these requirements runs the risk of being discarded in part or even entirely.

Cooperation: Ideally, every student in class should answer homework assignments by his/herself. I am not against you working with other students on homework to stimulate interactions and improve your understanding of material. If so, no written material should be exchanged between students and every student should write his/her own report. Other students with whom you interacted should be acknowledged on the homework (this will not be used in any ways to adjust your grade).

3) PROJECT

Schedule: There will be a project. The project will be centered on the material presented in the class and will be distributed in February and will be due in April.

Rules of the Game: You will be working in groups of 3-4 people.

4) Final:

Schedule: There will be a cumulative final. The final will be held on April 22, 2017 and will last up to 4 hours. Grades for the final will be available within a week of the final date.

Rules of the Game: You are not allowed to use textbooks or any published material during the exam. You are allowed to use crib-sheets. You are not allowed to use portable CD players, cell phones, PDAs,..., during the exam. You are allowed to use a calculator.

5) GRADE/RE-GRADES:

Homework will be graded according to a scheme that is pre-determined by the instructor.

Availability: Grades will only be available on E-learning. For reasons regarding privacy protection, the grades will not be communicated by phone/email.

When to Re-grade: Ideally, re-grades should be requested when the reason for the request is obvious (for example, the sums of the marks you got on every part do not add up to the total you received).

Procedure: You can ask for a re-grade every time you feel it is appropriate. Please submit the reason you're your request clearly. Re-grades for homework should be addressed to the TA. All other re-grade requests should be directed to the instructor. No re-grade will take place on the spot nor will be considered face-to-face.

Time Line: Every re-grade request should be entered within two weeks of the time at which the assignment is returned to the class.