



ISE 3102: Stochastic Methods in Operations Research

Spring 2021

Instructor: Julie Drzymalski, Ph.D., Professor, Director of the Industrial & Systems Engineering Program

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Email: Julie.drzymalski@temple.edu You will typically receive a response from me within one business day.

Office hours: TBD please see external announcement or always contact me to make an appointment

Course Meeting Time and Location: Tuesday and Thursday 11:00AM-12:20PM

COURSE DESCRIPTION

Probabilistic techniques of operations research. Topics include the applications of Markov chains, queueing and inventory control models to analyze and evaluate systems performance. Other topics include introduction to stochastic processes, review of probability, Markov chains and classification of their states, long-run Markov chains and applications, introduction to queueing theory, birth and death process, applications of queueing theory, introduction to inventory theory, components of inventory models, deterministic inventory models, stochastic inventory models, and introduction to forecasting.

Prerequisites: ISE 2103

Credit hours: 3

LEARNING OUTCOMES

After completing the class, students will be able to:

- Classify the states of a Markov chain and identify the significance of the terms in models of real-world settings
- Calculate steady-state probabilities and average waiting time for a queue
- Construct a decision tree to identify an optimal series of decisions made over time
- Ability to formulate a variety of real world problems as sequential decision making problems and apply Dynamic Programming to solve them
- Ability to use a variety of computational methods to solve stochastic shortest path problems
- Ability to reduce problems with imperfect state measurements to problems with perfect state measurements
- Ability to approximately solve large scale problems using techniques such as aggregation and rolling horizon methods
- Ability to formulate and solve infinite horizon problems




COURSE REQUIREMENTS

Textbook: The course material will be taken from the following texts, all available as open source material. You can obtain access to these on the Canvas site; most are available through the library website as well.

Probabilistic Dynamic Programming Kjetil K. Haugen [DP2.pdf](#) 

[Dynamic Programming.pdf](#) 

An Introduction To Stochastic Modeling, Teylor and Karlin, Third Edition [KarlinTaylor.pdf](#) 

Inventory Theory, Jaime Zappone [Zappone.pdf](#) 

Fundamentals of Queueing Theory, Fourth Edition. By D. Gross, J. F. Shortie, J. M. Thompson, and C. M. Harris, 2008 [Shortie, Thomson, Gross, Harris.pdf](#) 

The appropriate reading material will be listed for each topic covered.

HOW THIS COURSE WILL BE TAUGHT

1. Access the course meetings

The online classes will be held via Zoon which you can join by logging in to Canvas and clicking on the Zoom link on the left hand side or by the following:

Topic: Stochastic Models in Operations Research

Time: Jan 19, 2021 11:00 AM Eastern Time (US and Canada)

Every week on Tue, Thu, until Apr 22, 2021, 28 occurrence(s)

Please download and import the following iCalendar (.ics) files to your calendar system.

https://temple.zoom.us/meeting/tJMrfuGrqjsjGNHemGYfhzdzDN5_DuIZIpEF/ics?icsToken=98tyKuCvqDliGdCVuRuCRoWEBIr4WenwiGJEjY11mRLCOiZbeAfsEswXDZZqHOLc

Join Zoom Meeting

<https://temple.zoom.us/j/97698340925>

Meeting ID: 976 9834 0925

One tap mobile

+13126266799,,97698340925# US (Chicago)

+19292056099,,97698340925# US (New York)

Dial by your location

+1 312 626 6799 US (Chicago)

+1 929 205 6099 US (New York)



+1 301 715 8592 US (Washington D.C)

+1 346 248 7799 US (Houston)

+1 669 900 6833 US (San Jose)

+1 253 215 8782 US (Tacoma)

Meeting ID: 976 9834 0925

Find your local number: <https://temple.zoom.us/j/97698340925>

2. Technology Specifications and Limitations

If you do not have the means to access the course meetings, please let me know. Limited resources are available for students who do not have the technology they need for class. Students with educational technology needs, including no computer or camera or insufficient Wifi-access, should submit a request outlining their needs using the [Student Emergency Aid Fund form](#). The University will endeavor to meet needs, such as with a long-term loan of a laptop or Mifi device, a refurbished computer, or subsidized internet access.

3. Class Recordings

Each online class will be recorded and available for your use later in the day when it becomes available. You may not record this on your own with any other mechanism. If you have a need to do this for some reason, please contact me prior.

Any recordings permitted in this class can only be used for the student's personal educational use. Students are not permitted to copy, publish, or redistribute audio or video recordings of any portion of the class session to individuals who are not students in the course or academic program without the express permission of the faculty member and of any students who are recorded. Distribution without permission may be a violation of educational privacy law, known as FERPA as well as certain copyright laws. Any recordings made by the instructor or university of this course are the property of Temple University.

4. Expectations for Class Conduct

In order to maintain a safe and focused learning environment, we must all comply with the four public health pillars: wearing face coverings, maintaining physical distancing, washing our hands and monitoring our health. It is also important to foster a respectful and productive learning environment that includes all students in our diverse community of learners. Our differences, some of which are outlined in the University's nondiscrimination statement, will add richness to this learning experience. Therefore, all opinions and experiences, no matter how different or controversial they may be perceived, must be respected in the tolerant spirit of academic discourse.

Treat your classmates and instructor with respect in all communication, class activities, and meetings. You are encouraged to comment, question, or critique an idea but you are not to attack an individual. Please consider that sarcasm, humor and slang can be misconstrued in online interactions and generate unintended disruptions. Profanity should be avoided as should the use of all capital letters when composing responses in discussion threads, which can be construed as "shouting" online. Remember to be careful with your own and others' privacy. In general, have your behavior mirror how you would like to be treated by others.

GENERAL REQUIREMENTS

All material will be posted on Canvas.



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This course will require appropriate effort on your part to prepare for the lecture and follow up with practice. Each week you are expected to complete the readings, watch any posted videos/powerpoints, participate in class and complete any homework. Please come to class prepared with questions. If you are unclear about any material, please either ask in class, post on the muddiest points or come see me. I am available by email, e-chat, phone or in person during office hours and by appointment.

The graded elements include: attendance and participation, homework, labs, and quizzes.

Attendance and Participation: You are expected to come to each online class prepared to participate. Please make sure you have completed and necessary readings ahead of time and watched any relevant videos before the Wednesday class. Come to class with questions.

If you feel unwell, you should not come to campus, and you will not be penalized for your absence. Instructors are required to ensure that attendance is recorded for each in-person or synchronous class session. The primary reason for documentation of attendance is to facilitate contact tracing, so that if a student or instructor with whom you have had close contact tests positive for COVID-19, the university can contact you. Recording of attendance will also provide an opportunity for outreach from student services and/or academic support units to support students should they become ill. Faculty and students agree to act in good faith and work with mutual flexibility. The expectation is that students will be honest in representing class attendance.

Homework: Multiple homeworks will be assigned for each topical area.

Module Quizzes: There will be three quizzes throughout the course.

Discussions: Each topic will have a discussion board called “Muddiest Points” where you are welcome to post a problem or topic that is challenging you. This is meant to be a safe space for everyone to post without judgement from your peers. Some material comes easily to some while to others, different material may come easily. Please feel free to share your knowledge with your classmates if this is an area you feel confident in. If there is a critical mass, we can review in class

Grading

Grades will be based on the following:

Homework (6): 25% (lowest grade dropped)

Quizzes (3): 45%

Course Project: 25% (5% for presentation, 20% for deliverables)

Attendance and Participation: 5%



Grading Policies:

- All work must be submitted electronically unless certain exceptions are made in class
- You must cite ALL of your references (except the textbook), including other persons
- No extensions will be given after any due date and no late submissions are accepted. If you have extenuating circumstances and need extra time, please contact me directly well before the due date.
- No grade discrepancies will be taken into consideration two weeks past the return of the graded work.

Grading Scale:

GPA	Numeric
A=4.0	grade > 93
A- = 3.67	90 ≤ grade ≤ 93
B+ = 3.33	87 ≤ grade < 90
B = 3.0	83 ≤ grade < 87
B- = 2.67	80 ≤ grade < 83
C+ = 2.33	77 ≤ grade < 80
C = 2.0	73 ≤ grade < 77
C- = 1.67	70 ≤ grade < 73
D+ = 1.33	67 ≤ grade < 70
D = 1.0	63 ≤ grade < 67
D- = 0.67	60 ≤ grade < 63
F = 0	grade < 60

Tentative schedule is provided separately.

STUDENT SUPPORT SERVICES

The following academic support services are available to support you:

[Student Success Center](#)

[University Libraries](#)

[Undergraduate Research Support](#)

[Career Center](#)

[Tuttleman Counseling Services](#)

[Disability Resources and Services](#)

If you are experiencing food insecurity or financial struggles, Temple provides resources and support. Notably, the Temple University Cherry Pantry and the Temple University Emergency Student Aid Program are in operation as well as a variety of resources from the Office of Student Affairs.



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Academic Integrity

Freedom to teach and freedom to learn are inseparable facets of academic freedom. The University has a policy on Student and Faculty and Academic Rights and Responsibilities (Policy #03.70.02). Please familiarize yourself with Temple's [Student Conduct Code](#). All Temple students are expected to know and adhere to the information and guidelines presented.

Engaging in academic dishonesty will result in a failing grade at the discretion of the professor. Violations will be referred to the Dean and Office of Student Life for appropriate disciplinary action. The information will be recorded in the student's university file and will be provided to entities authorized to perform background checks.

In the case of group projects, each member is responsible for the entire submission. Depending on circumstances, plagiarism in group projects may be the responsibility of all members.

Disability Resources

Any student who has a need for accommodation based on the impact of a documented disability, including special accommodations for access to technology resources and electronic instructional materials required for the course, should contact me privately to discuss the specific situation by the end of the second week of classes or as soon as practical. If you have not done so already, please contact Disability Resources and Services (DRS) at 215-204-1280 in 100 Ritter Annex to learn more about the resources available to you. //we will work with DRS to coordinate reasonable accommodations for all students with documented disabilities.

Course Disputes

When conflicts or misunderstandings arise between the students and/or professor, the expectation is that all parties will act courteously and professionally. Issues should always be first addressed with your professor before contacting the administration.

Canvas

All course materials and assignments are located in the Canvas learning management system. You can login to Canvas through the [Temple University Portal](#).