

University of Massachusetts Amherst
MIE 380 Operations Research II

Instructor: <PROF_FULL_NAME>, Ph.D., P.E.
Office Hours: MW 10:30am – 12pm (in-person), TTh 9:30 – 11am (in-person),
F 8:30 – 9:30am (via Zoom: <LINK_ZOOM>)
E-mail: <PROF_EMAIL> (include “MIE 380” in the subject line)
Class Times: MW 8:40 – 9:55am, Marston Hall 211

Course Description: Stochastic models including discrete time Markov chains, continuous time Markov processes, Markov decision processes, queuing theory, dynamic programming and their application to manufacturing and service sector engineering processes.

Prerequisites: Math 235, MIE 273/CEE 260, MIE 379 preferred, MIE 124 or equivalent.

References:

1. Moodle: I will post class lecture slides, homework assignments and solutions, and other supplemental links here; however, I will not use this medium for late breaking news – I will simply make an announcement during our next class meeting.
2. Text: Fundamentals of Queueing Theory by Shortle, Thompson, Gross, and Harris, 5th Edition, Wiley 2018.

Grade Composition:

	<u>Weight</u>	<u>Dates & Remarks</u>
Homework Problems	5%	per class schedule
Mini-Projects	20%	per class schedule
Exams	50%	per class schedule
Final Exam	25%	per class schedule

Note: You have 14 calendar days after grades are posted to request regrading; I will not entertain a request after that time. I will regrade the complete assignment which could result in a lower grade.

Grading Scale:	A (93-100)	A- (90-92)	B+ (87-89)
	B (83-86)	B- (80-82)	C+ (77-79)
	C (73-76)	C- (70-72)	D+ (67-69)
	D (63-66)	F (0-62)	

Course Policies:

1. **Accommodations.** The University of Massachusetts Amherst aspires to be a barrier-free campus, and is committed to providing appropriate and reasonable accommodations for students with qualifying disabilities. If you have a qualifying disability and require accommodations while participating in this course, please work with Disability Services to

have an accommodation letter sent to me in a timely manner. The Disability Services website (www.umass.edu/disability) provides helpful information about how to register and offers descriptions of their programs and services. If you are eligible for exam accommodations, your exams will be administered by the exam proctoring center; contact Disability Services immediately, and comply with their exam scheduling policies, including the requirement that you book your exams at least seven days in advance. Note that sufficient time has been allotted for the completion of all assignments, inclusive of extra time. *Finally, it is incumbent upon you contact me during the first few weeks of the semester, or shortly following registration with Disability Services, to ensure that your accommodations are being sufficiently met, including extra time and note-taking access, as applicable.*

2. **Assignments.** All submitted work must be submitted using .pdf format – no exceptions and do not zip your files. In addition, you may be asked to submit supporting Excel files.
3. **Late Submissions.** You will be provided sufficient notice for all graded assignments; as such homework and projects should be submitted on time. All assignments are due before midnight (11:55pm) and must be uploaded to Moodle on the due date. In the interest of fairness to students who do submit their assignments on time, work submitted after the due date and time will be subject to a 15% late penalty within the first 24 hours and an additional 5% for every day thereafter up to 2 days after which solutions will be posted. Exceptions may be granted in the event of an emergency or extenuating circumstances if requested at least 24 hours *prior* to the due date and time.
4. **Attendance.** ~~There will be graded in-class exercises and quizzes. No make-up assignments will be given.~~ Whether you attend class or not, gives me a strong indication if you care about the class and the material. I expect you to attend class unless you have a good reason and notify me *before* class.
5. ~~**Class materials.** Bring a pencil, calculator, and notebook to class; you will need your own (no sharing) for in-class exercises and quizzes.~~
6. **Etiquette.** Include a salutation, your name, MIE 380, and question/issue clearly in all e-mails; I will not answer e-mails that fail to include this information.
7. **Exams.** Assigned text, ~~Smart sheet,~~ pencil (no pens), and calculator only. ~~No notes or “loose leaf” material,~~ cell phones, or laptops permitted. You must clearly and neatly show your work to receive partial or full credit.
8. **Gender Respect & Title IX.** The University of Massachusetts Amherst aspires to be a university environment that is free of discrimination, sexual harassment, and sexual violence. If you or someone you know has experienced sexual assault, sexual misconduct, or sexual discrimination please see <https://www.umass.edu/titleix/> for information about resources and reporting options. A report to the Title IX Coordinator, Kerri Thompson Tillett, J.D., may be made at any time through the online reporting tool, the Title IX Coordinator’s email (<EMAIL>), telephone number (<PHONE>) or mail. UMass Amherst is committed to supporting community members who report concerns of prohibited conduct. Please reach out to me if you would like assistance connecting with any of these resources/options.
9. **Health & Wellbeing.** You are not alone at UMass – many people care about your wellbeing and many resources are available to help you thrive and succeed. The College recognizes that coursework is challenging and that classes are not the only demand in your life. Success

in this course and the College of Engineering depends heavily on your personal health and wellbeing. Recognize that while stress is an expected part of the college experience, it can be compounded by unexpected setbacks or life changes outside the classroom. Strive to reframe challenges as an unavoidable pathway to success. Reflect on your role in taking care of yourself throughout the term, before the demands of exams and projects reach their peak. Please feel free to reach out to me about any difficulty you may be having that may impact your performance as soon as it occurs and before it becomes too overwhelming. You can also learn about the confidential mental health services available on campus by calling the Center for Counseling and Psychological Health (CCPH) by visiting their website at umass.edu/counseling. They provide a lot of resources beyond individual therapy. Check-out some of their great, free resources, including *Togetherall* and *Welltrack*. There are many other resources on campus for students facing personal, financial or life challenges to find support, stay in school, and graduate (<https://www.umass.edu/studentlife/single-stop>).

10. **Inclusivity.** The diversity of the participants in this course is a valuable source of ideas, problem solving strategies, and engineering creativity. If you feel that your contribution is not being valued or respected for any reason, please speak with me privately. If you wish to communicate anonymously, you may do so in writing, speak with Assistant Dean <NAME> , <EMAIL>, or submit your concern through the College of Engineering Climate Concerns and Suggestions on-line form (tinyurl.com/UMassEngineerClimate) or Classroom Experience form <https://tinyurl.com/UMassEngineerClassroom>. We are all members of an academic community with a shared responsibility to cultivate a climate where all individuals are valued and where both they and their ideas are treated with respect.
11. **Integrity.** There is no place for a dishonest engineer. Read and comply with the academic honesty policy: http://www.umass.edu/dean_students/academic_policy. I expect the work you submit to be your own – no electronic or manual copying; however, you can get help from peers or TA. *I reserve the right to conduct oral exams of any submitted student work to verify whose work was submitted. If you fail the oral exam, you will earn a zero on the assignment.* Maintaining the integrity of scholarship and research within institutions of higher education requires a cultural commitment. The University Academic Honesty Policy Applies in this and all courses. Academic dishonesty includes but is not limited to cheating, fabrication, plagiarism, and *abetting or facilitating* dishonesty. Since students are expected to be familiar with this policy and the commonly accepted standards of academic integrity, ignorance of such standards is not sufficient evidence of lack of intent. Concerns about academic dishonesty may be reported to the course instructor, another trusted faculty or staff member, the department head, or anonymously through the department (refer to departmental webpage) or College's classroom experience form (<https://tinyurl.com/UMassEngineerClassroom>).

Class Schedule

Lesson	Dates	Class Topic	Reading	Due
1	9/7	Introduction	1.1-1.3	
2	9/12	Little's Law	1.4-1.7	
3	9/14	Exponential Distribution	2.1	
4	9/19	Poisson Process	2.2	HW 1
5-7	9/21-28	Discrete-Time Markov Chains	2.3	
8-9	10/3-5	Continuous-Time Markov Chains	2.4	
10	10/12	Exam 1 review	1.1-2.4	HW 2
11	10/17	Exam 1 (<i>Lessons 1-9</i>)	1.1-2.4	
12-14	10/19-26	Simple Markovian Queuing Models I	3.1-3.4	M-P 1
15-16	10/31-11/2	Simple Markovian Queuing Models II	3.5-3.12	HW 3
17	11/7	Bulk Input & Service	4.1-4.2	
18	11/9	Erlang Models	4.3-4.4	HW 4
19	11/14	Exam 2 review	3.1-4.4	
20	11/16	Exam 2 (<i>Lessons 12-18</i>)	3.1-4.4	
21-22	11/21-28	Jackson Networks	5.1-5.3	M-P 2
23	11/30	Non-Jackson Networks	5.4-5.6	
24	12/5	Single Server Models	6.1	HW 5
25	12/7	Multiserver Models	6.2-6.3	
26	12/12	Final Exam review	1.1-6.3	HW 6
	TBD	Final Exam (<i>Lessons 1-26</i>)	1.1-6.3	