Math 4610 Syllabus - Fall 2020

Meets: Remote asynchronous

Instructor: Dr. Pieter Allaart

Office: GAB, Room 415 (though you won't find me there very much at all this semester!)

E-mail: allaart@unt.edu

Office Hours: By appointment only. Contact me if you wish to meet with me, and we will set up a Zoom meeting at a time convenient to you.

Book: Introduction to Probability, by Anderson, Seppäläinen and Valkó.

Prerequisites: Math 2730 and Math 3680.

Grading: Grades will be based on six short mid-term exams, homework, a self-introduction video, and a final exam, weighted as follows:

- Mid-term exams: 60% total
- Homework: 12%
- Self-introduction video: 3%
- Final exam: 25%

Mid-term Exams: The mid-term exams will be given on Wednesday, September 9 and at roughly two-week intervals thereafter. They will be 30 minutes in length, plus 10 minutes for file upload. You will be given a 24 hour time window during which to take each exam. The lowest of your six exam scores will be dropped; the remaining five each make up 12% of your grade. The final exam will be two hours long, plus 20 minutes for file upload, and you will be given a 24 hour time window during which to take the exam. This time window will include part of Monday, December 7 and/or part of Tuesday, December 8. You will be required to use a webcam for all exams (see below). You are not allowed to receive outside help on the exams or to use any resources other than the ones expressly permitted by your instructor.

LockDown Browser and Respondus Monitor: You will be required to use LockDown Browser and Respondus Monitor for all exams in this course. See the heading "Getting Started with LockDown Browser & Respondus Monitor" in the Introduction module in Canvas for details.

Homework: Each module includes a weekly homework assignment with a clearly communicated due date. Collaboration on homework (for instance, using the discussion board in Canvas) is permitted and even encouraged, but each student must submit their own homework. Homework must be written neatly and legibly. You should scan and upload your homework in Canvas. Be sure your work is legible before uploading! A selection of the problems will be graded and your work will be returned in Canvas with brief comments. For more elaborate feedback I recommend that you contact me. Homework which is messy or difficult to read

will not be graded! Your two lowest homework grades will be dropped. In view of this, **late homework will not be accepted**, regardless the reason.

Early bird bonus: If you submit your homework at least 24 hours before the deadline, you will receive 5% extra credit!

Self-introduction video: During the first week of the course you will be asked to upload a short video (1 minute or so) introducing yourself. This will help foster a sense of community in the class, as there are no organized class meetings.

Expectations: The format of this course is remote asynchronous, meaning that there are no organized meetings at set times. This gives you the flexibility to study at the times that are most convenient for you. On the other hand, it requires greater independence on your part than a traditional lecture course. Each week, you will watch 2-3 short lecture videos (typically about 10-15 minutes long) that cover the most important concepts. But you should also read the indicated sections in the textbook for more examples and for some proofs of theorems that are omitted in the lecture videos.

Communication: For faster response, it is best to use my UNT email address above, though I will also periodically check my Canvas inbox. I will respond to every email within 24 hours (except for holidays and weekends), and usually much faster than that. If you email me after 10:00 pm with a question, do not expect a reply until the following day!

Extra credit: Do not expect to be able to do some extra work to help your grade either before or after the final exam. There will be no extra credit other than perhaps an extra problem on an exam. Your best bet to help your grade is to do the required work at the time it is assigned.

Disabilities: The University of North Texas makes reasonable academic accommodation for students with disabilities. Students seeking accommodation must first register with the Office of Disability Accommodation (ODA) to verify their eligibility. If a disability is verified, the ODA will provide you with an accommodation letter to be delivered to faculty to begin a private discussion regarding your specific needs in a course. You may request accommodations at any time, however, ODA notices of accommodation should be provided as early as possible in the semester to avoid any delay in implementation. Note that students must obtain a new letter of accommodation for every semester and must meet with each faculty member prior to implementation in each class. For additional information see the Office of Disability Accommodation website at http://www.unt.edu/oda. You may also contact them by phone at 940.565.4323.

Cheating: No cheating will be tolerated. Anyone caught cheating will be subject to any penalty the instructor deems appropriate, up to and including an automatic F for the course. Furthermore, a letter will be sent to the appropriate dean.

List of topics and tentative schedule:

Week	Section(s)	Topic(s)
1	1.1, 1.4, 1.2	Sample spaces and probabilities, Review of set theory, rules of probability, Random sampling
2	1.3, 1.5	Infinite sample spaces, Introduction to random variables, Conditional probability
3	2.2, 2.3	Bayes' formula, Independence, **Exam 1**
4	2.3, 2.4	Independent random variables, the binomial distribution, the geometric and negative binomial distributions
5	2.5	Conditional independence, the hypergeometric distribution, birthday problem, **Exam 2**
6	3.1, 3.2	Absolutely continuous random variables, densities, Cumulative distribution functions
7	3.3, 8.1	Expectation, indicator method, Median and quantiles, **Exam 3**
8	3.4, 4.5	Variance, the exponential distribution, the normal distribution
9	4.1, 4.3	Normal approximation of the binomial distribution, continuity correction, Applications of the normal approximation, **Exam 4**
10	4.4, 5.2	The Poisson distribution, Poisson approximation of the binomial distribution, Distribution of a function of a random variable
11	6.1, 6.2	Joint distributions of discrete random variables, multinomial distribution, Jointly continuous random variables, **Exam 5**
12	6.3, 7.1	Joint distributions and independence, Sums of independent random variables, convolution
13	8.1, 8.2, 8.4	Linearity of expectation, expectation and independence, covariance and correlation, **Exam 6**
14	9.1, 9.2, 9.3	Estimating tail probabilities, Law of large numbers, Central Limit Theorem
15		Review