

36-752: Advanced Probability Overview Spring 2018

Instructor:

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TA:

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Office Hour: Wednesday, 9:30am-10:30am, BH132Q.

Lectures:

Tuesday and Thursday, noon - 1:20am, DH 2122.

Class Website:

<http://www.stat.cmu.edu/~arinaldo/Teaching/36752/S18/>

Please check the website on a regular basis.

Prerequisites:

- Prerequisites: Calculus; Real analysis; Undergraduate Probability Theory.
- 36-705: Intermediate Statistics

As a general rule, if you already took a class on measure theory and integration (such as 21-720 or equivalent), you will not be allowed to register for this class.

Course Description

This is a one-semester course covering essential topics in probability underpinning theoretical statistics. One of the main goals of this course is to provide you with adequate theoretical background and mathematical tools to access the literature on mathematical statistics. The course is comprised of three modules: (1) basic measure theoretic concepts in probability; (2) modes of stochastic convergence and their applications in statistics and (3) concentration of measure and concentration inequalities.

Please note that the structure and content of the course will be different than in past years. In particular, this is no longer (just) /webisa class in measure theory and probability.

Class material:

Lecture notes on the first part of the material and reading material will be distributed as the class progresses.

For the first module on measure theory and probability, the following books are recommended:

- Probability Theory & Measure Theory, 2nd Ed., by R. Ash and C. Dolans-Dale
- Probability, Theory and Examples, 4th Ed., by R. Durrett.
- Probability and Measure, 3rd edition, by P. Billingsley.

Further reading material and notes will be posted on [the website](#).

Course Grading:

Your assessment and grades will be determined as follows:

- Homework assignments (70%).
- Scribe duties (10%).
- Attendance and class participation (5%).
- Final Exam (15%).

Any failure to turn in any assignment, to fulfill the scribe duties and to miss a significant number of lectures without informing me of your absence or without a reasonable excuse will result in a lower grade.

Scribe duties:

Each student will take turn in transcribing the notes of every lecture in electronic format using the latex template available at <http://www.stat.cmu.edu/~arinaldo/Teaching/36752/S18/schedule.html>. The scribe has to attend class, take good and accurate notes, check for mistakes and inconsistencies, write them up in latex, add references and expand the material if appropriate and after consulting with me. The resulting pdf and latex files have to be submitted for my approval within one week. The pdf files containing the lecture notes will be posted on the class website.

Homework:

Homework problems will be assigned every 10-15 days. The problems will be mostly of theoretical nature and will essentially be proofs.

There is a great value in discussing problems and sharing knowledge with your classmate, so you are encouraged to engage in group work. However, you should attempt to solve homework problems by yourself and only afterwards meet and compare with others.

Cheating or plagiarism on homework and exam will be dealt with to the full extent allowed under CMU policies: see <https://www.cmu.edu/academic-integrity/defining/cheating.html>

Attendance and Involvement:

It is important that you attend class, as the selection and organization of the topics will be on occasion different from the notes and textbooks. If you know you will be absent for few consecutive lectures, please let me know.

Come and see me any time you are confused or stuck and don't be shy in class: the more questions

you ask and the more feedback I receive from you, the better I will be able to tailor the lectures to your specific needs.

Final Exam:

TBA

Wellness:

Course work at this level can be intense, and we encourage you to take care of yourself. Do your best to maintain a healthy lifestyle this semester by eating well, exercising, socializing, getting enough sleep and taking some time to relax. This will help you achieve your goals and cope with stress. All of us benefit from support during times of struggle. If you are having any problems or concerns, do not hesitate to come speak with either of us. There are also many resources available on campus that can provide help and support. Asking for support sooner rather than later is almost always a good idea. If you or anyone you know experiences any academic stress, difficult life events, or feelings like anxiety or depression, we strongly encourage you to seek support. Counseling and Psychological Services (CaPS) is here to help: call 412-268-2922 and visit their website at <http://www.cmu.edu/counseling/>. Consider also reaching out to a friend, faculty member, or family member you trust to help get you the support you need.

Disability Resources

If you require a special accommodation, such as needing more time to finish exams, please visit the Office of Disability Resources to obtain appropriate documentation. See <http://www.cmu.edu/hr/eos/disability/students/>