

ST 779, FALL 2018
Advanced Probability for Statistical Inference
3 credits; Prerequisite: MA425/511 and ST521 or equivalent
Instructor: Subhashis Ghoshal
MW 8:30-9:45, SAS 1108

Instructor:	Subhashis Ghoshal	TA:	Moumita Chakraborty
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Important: TA Moumita Chakraborty will be only responsible for office hours, not for homework grading. Homework will be graded by Weilian Zhou, who will not have regular office hours. Only if you have a grading question or concern for homework, you can make appointment with him to discuss that issue. His e-mail address is wzhou11@ncsu.edu. If you are absent on homework due date or somehow missed to submit in the class, you can submit by 5pm on the due date by e-mail to him (or by putting a hard copy in his mailbox). In the latter case, please alert him. There will be no acceptance after 5pm of the due date, electronic or hard copy. Except for in-class submission on the due date, please directly deal with Weilian.

Text: *A Probability Path* by Sidney Resnick (1999), Birkhauser, ISBN 0-8176-4055-X

Course content: Preliminaries, Classes of events, random variables, independence, probability measures, integration and expectation, product spaces and joint distributions, convergence of random variables, laws of large numbers, characteristic function, central limit theorems, absolute continuity, conditional expectation and conditional probability.

Background and goals: This course is designed to train graduate students on theoretical foundations of probability theory, integration techniques and properties of random variables and their collections. Techniques learned from this course play important roles in statistical inference and all branches of mathematical statistics. Homework will involve application of the theorems taught in the course in more concrete contexts.

1. **Grading Policies:** Your final grade is determined by a weighted combination of homework and class performance (25%), mid-term 25% and the final 50%. Plus/minus grading will be used. A rough guide for the grades (including plus/minus) is as follows: 90% for A, 80% for B, 70% for C, 60% for D, less than 60% is F.

2. **Homework:** Homework problems in pdf will be posted on Moodle at

least one week prior to the due date. Tentative due dates are Sep 5, 12, 19, 26, Oct 3, 10, 24, 31, Nov 7, 14, 28. Late homework submission is *not* acceptable. Copying is strictly forbidden, earns no credit and may lead to severe disciplinary action. The worst homework score will be dropped.

3. Course calendar:

First day of class, August 22; Mid-term October 12; No class September 3 (labor day), November 21 (pre-thanksgiving), Last day of class December 5.

4. Exams: There will be two exams in this course:

Mid-term: Wednesday, October 17, 8:30-9:45 am, 1108 SAS Hall.

Final: Monday, December 10, 8-11 am, 1108 SAS Hall.

You can use one formula sheet (letter size, two sided) in the exams.

Missing exam means automatic zero without documented medical reason plus prior permission (except in extreme emergencies).

5. Web and e-mail assistance: Course material including slides will be posted on Moodle; see <http://wolfware.ncsu.edu/> and login to ST 779 page. It will be helpful to keep a hard or soft copy of the slides and notes and bring in the class.

E-mail is preferred mode of communication. Homework and other announcements will be posted on Moodle in due time.

6. Attendance and class performance: You are required to attend the class, arrive in time and participate in activities such as in-class problem solving. If you are going to miss a class for a reasonable cause, notify the instructor in advance as a courtesy. See university's Attendance Regulation (REG02.20.03) for the list of excused absences.

Derivations are not given in the slides but will be done in the class. Posted notes contain derivation of most results and illustrations, so that you can concentrate on listening instead of copying from the board. Also the text contains proofs of all theorems. The slides are not substitute for the text and the text is required. The slides will be used in the class for a better organization. Occasionally some problems from the text will be discussed in the class. Your participation in the process is highly appreciated and may be rewarded. It will be helpful to bring a copy of the text in the class for convenience.

7. Audit Policy: Class attendance, homework (at least 80% score required for passing grade). Auditing students are exempted from taking mid-terms and the final.

8. Accommodation for disabilities: Reasonable accommodations will be made for students with verifiable disabilities. In order to take advantage of available accommodations, students must register with Disability Services for Students at 1900 Student Health Center, Campus Box 7509, 515-7653. For more information on NC State's policy on working with students with disabilities, please see the Academic Accommodations for Students with Disabilities Regulation (REG02.20.01).

9. Honor pledge: Submission of any test or assignment, take home or in class, automatically implies agreeing to the following honor "I have neither given nor received unauthorized aid on this test or assignment", although students will not have to explicitly sign the honor pledge every time they take a test or assignment.

Integrity: University regulations require that every course syllabus remind students that the Code of Student Conduct defines a university policy on academic integrity already pledged by each student. Instructors assume that the students' names on their submitted work imply compliance with this policy. See <http://www.fis.ncsu.edu/ncsulegal/41.03-codeof.htm>