NC STATE UNIVERSITY

MA 421 Course Syllabus

Introduction to Probability

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INSTRUCTOR INFORMATION

Name	Office Phone	Email	Office Location
Andrew Papanicolaou	[###.###.####]	apapani@ncsu.edu	SAS, 3152

Virtual Office Hours

I will hold virtual office hours Tuesdays and Thursdays from 2PM to 4PM, on my personal Zoom

https://ncsu.zoom.us/j/7677581802?pwd=UDU1OFpVaWl1ZUpOT0c5dFJhaDRNZz09

Preferred Method of Communication

Outside of office hours the best way to reach me is through my NC State email (see above).

Response Time

I generally will respond the same day, if not then the following morning.

COURSE INFORMATION

Course Website: https://wolfware.ncsu.edu/courses/my-wolfware/

Meeting Time and Tool Used

Lectures are held MWF 10:40-11:30AM on Zoom

Prerequisites/Corequisites

MA 242 (Calculus III) There will be a graded homework on the prerequisites assigned on the day of the first class (due the week after, in class) to help you self-assess whether you are ready for this course.

COURSE OVERVIEW

Catalog Description

Axioms of probability, conditional probability and independence, basic combinatorics, discrete and continuous random variables, joint densities and mass functions, expectation, central, limit theorem, simple stochastic processes.

Structure

This is a synchronous online course. We meet 3 times per week using Zoom, and each week's objective is to complete a module based on the book of Bertsekas and Tsitsiklis. Homeworks will be assigned on Mondays and be due the following Monday.

COURSE MATERIALS

Required Textbook and/or Software

Introduction to Probability (2nd Edition) by D. Bertsekas and J. Tsitsillis, Athena Scientific

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TECHNOLOGY REQUIREMENTS

Hardware

NC State's Online and Distance Education provides technology requirements and recommendations for computer hardware.

Software

It is essential for participants to be familiar with and be ready to use Moodle, Wolfware, Zoom and some form of PDF viewer.

Moodle and Wolfware is where all course resources are made available.

- Moodle and Wolfware
  - Moodle Accessibility Statement
  - Moodle Privacy Policy
  - NCSU Privacy Policy

A PDF viewer is required to view the course slides and assignments

- Adobe Reader (for reading PDF files)
  - Accessibility Statement
  - Adobe Privacy Policy

Zoom is where the course meets and all oral instructions are delivered

- Zoom:
  - Zoom Accessibility Statement
  - Zoom Privacy Policy

A scanning device or camera that can take digital photos. This is for students who are writing their assignments by hand. For students taking pictures of their homeworks, a way to combine into a single document is to paste the picture file into a Microsoft Word document,

- Office 365
  - Accessibility Statement
  - Privacy Policy
- Headsets with microphone (optional for synchronous events)
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NETIQUETTE

Netiquette is the term used to describe the special set of rules for online communication.

Students should be aware that their behavior impacts other people, even online. I hope that we will all strive to develop a positive and supportive environment and will be courteous to fellow students and your instructor. Due to the nature of the online environment, there are some things to remember when taking an online course and engaging with others.

Tips for Success:

- **Do**: Follow the same standards of behavior that you subscribe to offline. Keep in mind that all online communication is documented and therefore permanent.
- **Don't**: Flame others in discussion forums. Flaming is the act of responding in a highly critical, sarcastic, or ridiculing manner – especially if done on a personal level. Remember that these discussions are meant for constructive exchanges and learning!

- **Do**: Ensure you are responding to forums by the due date, in order to leave time for peers to comment on your response.
- **Don't**: Go for long periods of time without communicating to your instructors or classmates. It is important to stay a part of the online community!
- **Do**: Remember to read over your posts before selecting "Submit."
- **Don't**: Use slang, poor grammar, and other informal language in discussion forums or email messages to instructors or classmates.

Additional resources

- DELTA's Netiquette or Best Practices for Teaching Online
- Netiquette – Ethics in Computing

GRADING

Grading Policy

Course grades will be calculated with the following weights:

- 30 % - Homework Assignments.
- 30 % - Midterm
- 40 % Final Exam

Grading Scale

This course uses this grading scale:

Low	Letter	High
97 ≤	A+	≤ 100
93 ≤	A	< 97
90 ≤	A-	< 93
87 ≤	B+	< 90
83 ≤	B	< 87

80 ≤	B-	< 83
77 ≤	C+	< 80
73 ≤	C	< 77
70 ≤	C-	< 73
67 ≤	D+	< 70
63 ≤	D	< 67
60 ≤	D-	< 63
0 ≤	F	< 60

COURSE SCHEDULE

Please note: course schedule is subject to change.

Week	Date Range	Topic	Readings	Activities [Assignments, quizzes, tests, etc.]	Due Date
Week 1	Aug 10-14	sample space and probability	Ch.'s 1.1, 1.2 and 1.3 of B&S	Calculus review assignment	Aug 17
Week 2	Aug 17-21	sample space and probability	Ch.'s 1.4, 1.5 and 1.6 of B&S	Assignment Based on this week's module	Aug 24
Week 3	Aug 24-28	discrete random variables (RVs)	Ch.'s 2.1, 2.2 and 2.3 in B&S	Assignment Based on this week's module	Aug 31
Week 4	Aug 31-Sep 4	discrete RVs	Ch.'s 2.5, 2.6, 2.7, 2.8 in B&S	Assignment Based on this week's module	Sep 7
Week 5	Sep 7-11	general RVs	Ch.'s 3.1, 3.2, and 3.3	Assignment Based on this week's module	Sep14
Week 6	Sep 14-18	general RVs	Ch.'s 3.4, 3.5 and 3.6	Take-home midterm	Sep 21
Week 7	Sep 21-25	further topics	Ch.'s 4.1, 4.2 and 4.3	Assignment Based on this week's module	Sep 28

Week 8	Sep 28-Oct 2	limit theorem	Ch.'s 4.4 and 4.5	Assignment Based on this week's module	Oct 5
Week 9	Oct 5-9	limit theorems	Ch.'s 5.1, 5.2 and 5.3,	Assignment Based on this week's module	Oct. 12
Week 10	Oct 12-16	CLT, strong LLN	ch.'s 5.4 and 5.5	Assignment Based on this week's module	Oct. 19
Week 11	Oct 19-23	Bernoulli process and Poisson process	ch.'s 6.1 and 6.2	Assignment Based on this week's module	Oct 26
Week 12	Oct 26-30	Markov chains	ch.'s 7.1, 7.2, and 7.3	Assignment Based on this week's module	Nov 2
Week 13	Nov 2-6	Bayesian Inference	Ch's. 8.1, 8.2 and 8.3	Assignment Based on this week's module	Nov 9
Week 14	Nov 9-13	Classical Statistical Inference	Ch.'s 9.1, 9.2, 9.3 and 9.4	Prepare for final exam	

COURSE POLICIES

Late Assignments

Late assignments will be accepted with 5 points taken off for every day submitted late. Assignments submitted later than two weeks passed the original due date will NOT be accepted.

Incomplete Grades

Incomplete grades will be considered on a case-by-case basis.

Attendance and Participation

There is no grade of attendance or participation in this class. Here is a link to NC State's Attendance Policy: https://policies.ncsu.edu/regulation/reg-02-20-03-attendance-regulations/ and the Withdrawl Process: https://studentservices.ncsu.edu/your-classes/withdrawal/process/

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UNIVERSITY POLICIES

Academic Integrity and Honesty

Students are required to comply with the university policy on academic integrity found in the Code of Student Conduct. Therefore, students are required to uphold the university pledge of honor and exercise honesty in completing any assignment.

Please refer to the Academic Integrity web page for a detailed explanation of the University's policies on academic integrity and some of the common understandings related to those policies.

For use in courses with online exchanges among students and the instructor, but NOT persons outside the course:
Students may be required to disclose personally identifiable information to other students in the course, via electronic tools like email or web-postings, where relevant to the course. Examples include online discussions of class topics and posting of student coursework. All students are expected to respect the privacy of each other by not sharing or using such information outside the course.

Students are responsible for reviewing the NC State University PRR's which pertains to their course rights and responsibilities:

- Equal Opportunity and Non-Discrimination Policy Statement and additional references
- Code of Student Conduct
- Grades and Grade Point Average
- Credit-Only Courses
- Audits

Students with Disabilities

Reasonable accommodations will be made for students with verifiable disabilities. In order to take advantage of available accommodations, students must register with the Disability Resource Office at Holmes Hall, Suite 304,Campus Box 7509, 919-515-7653 . 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)

Trans-Inclusive Statement

In an effort to affirm and respect the identities of transgender students in the classroom and beyond, please contact me if you wish to be referred to using a name and/or pronouns other than what is listed in the student directory.

Basic Needs Security

Any student who faces challenges securing their food or housing or has other severe adverse experiences and believes this may affect their performance in the course is encouraged to notify the

professor if you are comfortable in doing so. Alternatively, you can contact the Division of Academic and Student Affairs to learn more about the Pack Essentials program https://dasa.ncsu.edu/pack-essentials/

COURSE EVALUATIONS

ClassEval is the end-of-semester survey for students to evaluate instruction of all university classes. The current survey is administered online and includes 12 closed-ended questions and 3 open-ended questions. Deans, department heads, and instructors may add a limited number of their own questions to these 15 common-core questions.

Each semester students' responses are compiled into a ClassEval report for every instructor and class. Instructors use the evaluations to improve instruction and include them in their promotion and tenure dossiers, while department heads use them in annual reviews. The reports are included in instructors' personnel files and are considered confidential.

Online class evaluations will be available for students to complete during the last two weeks of the semester for full semester courses and the last week of shorter sessions. Students will receive an email directing them to a website to complete class evaluations. These become unavailable at 8am on the first day of finals.

> Contact ClassEval Help Desk: classeval@ncsu.edu
> ClassEval website
> More information about ClassEval

SYLLABUS MODIFICATION STATEMENT

Our syllabus represents a flexible agreement. It outlines the topics we will cover and the order we will cover them in. Dates for assignments represent the earliest possible time they would be due. The pace of the class depends on student mastery and interests. Thus minor changes in the syllabus can occur if we need to slow down or speed up the pace of instruction.