STA 4321 (class number 25940)

Spring 2020

Introduction to Probability

T 08:30-10:25, R 08:30-09:30 in FLO 100

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Course Website: e-Learning

Course Communication:

- Discussion forum in e-Learning.
- Office hours (posted under "Pages" in e-Learning).
- E-mail for questions regarding course policies. (Ensure that **STA 4321** or **5325** is in the subject line. Failure to do so may result in a non-response.)

Required Text(s): *Mathematical Statistics with Applications*, 7th Edition
Author(s): D. Wackerly, W. Mendenhall, R.L. Scheaffer
ISBN-13: 9780495110811

Course Description: The sequence of courses STA 4321-4322 provides a formal and systematic introduction to mathematical statistics. STA 4321 introduces the background in probability that is necessary to understand the classical statistical theory introduced in STA 4322. Major topics include theory of probability, counting rules, conditional probability, independence, additive and multiplicative laws, Bayes Rule. Discrete and continuous random variables, their distributions, moments and moment generating functions. Multivariate probability distributions, independence, covariance. Distributions of functions of random variables, sampling distributions, central limit theorem.

Prerequisite(s): MAC 2313 (or equivalent)
Credit Hours: 3

Software: You will need a computer for the homework assignments and practise. The main software used in class will be R.

Course Goals and Objectives:

1. Calculate probabilities of events using counting rules; calculate conditional probabilities; determine independence of events; apply the Law of Total Probability and Bayes' Rule.
2. Calculate probabilities, moments and moment generating functions for discrete and continuous random variables.
3. Recognize commonly used discrete and continuous random variables.
4. Calculate probabilities and moments for multivariate distributions; obtain marginal and conditional distributions; calculate covariance and correlation and determine independence of random variables; obtain expectations and variances for linear combinations of random variables.
5. Find the distribution of a function of random variables using the methods of distribution functions, transformations, and moment generating functions; perform bivariate transformations using Jacobians; calculate joint distributions and moments of order statistics.

Course Policies

The instructor reserves the right to update any parts of this syllabus as necessary.
Students will promptly be notified of any changes.

Demeanor

All members of the class are expected to follow rules of common courtesy in all classroom discussions, email messages, threaded discussion and chats. Please refer to expected class netiquette online and during class.

Electronic devices

During class time, only laptops and tablets are allowed. Cell phones, smartphones, and phablets are not permissible unless otherwise specified by the instructor. A student found using said device or permissable device used for non-classroom related activities during class time will be asked to leave the classroom which may result in missing any remaining assignments administered during class time.

Assignments

- Students are expected to work independently, unless otherwise specified in writing. **Offering** and **accepting** solutions from others is an act of **plagiarism**, which is a serious offense and **all involved parties will be penalized according to the UF Honor Code** receiving a 0 on the assignment and an incident report filed. Discussion amongst students is encouraged, but when in doubt, direct your questions to the instructor.
- **No late assignments will be accepted under any circumstances**.

- Students are expected to show and explain how the answers were obtained.
- All electronically **submitted work must be in pdf format** or a standard file format such as doc, jpeg, etc.

Homework/Quizzes

There will be homework assigned on a regular basis as *suggested homework* (not to be turned in) containing data analysis problems and/or book exercises. Suggested homework will be posted under "Assignments".
A *timed* quiz assignment based on the topics covered in class (and loosely based on the suggested homework) will be administered the day of the suggested homework deadline as either

- In-class (closed notes).
- Online (Only 1 attempt. It is highly encouraged to use a **reliable device** with a **reliable wired ethernet internet connection**. As soon as work is submitted a grade of 0 will show up as a placeholder until the assignment is graded.)

but which format will not be announced prior. For the best preparation students are encouraged to complete the full suggested homework set by the deadline posted on the suggested homework, indicating when you should ready to take the quiz. Solutions to suggested homework will not be posted, but solutions to the quizzes will be.

Exams

There will be three (3) in-class exams that will compose of multiple choice questions and possibly some open-ended questions. Exams will emphasise more on conceptual questions while HW/Quizzes will be more computational (not always).
Allowed material:

- Provided formula sheet. Sheet will be provided ahead of time with practise set.
- Scientific/Graphing Calculator. No cell phones.

General

- Students are expected to work independently, unless otherwise specified. **Offering** and **accepting** solutions from others is an act of **plagiarism**, which is a serious offense and **all involved parties will be penalized according to the Academic Honesty Policy**. Discussion amongst students is encouraged, but when in doubt, direct your questions to the instructor or teaching assistant.
- **No late assignments will be accepted under any circumstances**.
- Students are expected to show and explain how the answers were obtained.
- All electronically **submitted work must be in pdf format**.

Important dates:

Exam #1 ..... February 11, at 08:30
Exam #2 ..... March 17, at 08:30
Exam #3 ..... April 21, at 08:30

Grading

Grade distribution:

Exams 1, 2 and 3	75% (15% lowest, 30% second best, 30% best)
Homework/Quizzes	25% (lowest 2 are dropped, conditional on at least 12 total quizzes)
Extra Credit	0-1% (discussion forum and classroom participation)

Letter grade assignment:

		A	91 to 100	A-	88 to $<$ 91
B+	84 to $<$ 88	B	80 to $<$ 84	B-	77 to $<$ 80
C+	74 to $<$ 77	C	70 to $<$ 74	C-	67 to $<$ 70
D+	64 to $<$ 67	D	60 to $<$ 64	D-	55 to $<$ 60
E	$<$ 55				

To view the result of the letter grades to your GPA please visit the UF Grade and Grading Policies.
Final grades shown on Canvas are not accurate because they do not account for the conditional weighing of exams and quizzes.
Final grade **will not be rounded up** and can be calculated with exams as a % (out of 100) and quizzes out of 10 points

$$\begin{aligned}\text{Final} =& 0.15(\text{worst exam}) + 0.30(\text{second best exam}) + 0.30(\text{best exam}) \\ &+ 0.25(100)\left(\frac{\sum^{\#\text{ total}} \text{quizzes} - \sum^{\#\text{drops}} \text{lowest}}{10(\#\text{ of quizzes} - \#\text{ of drops})}\right) \\ &+ \text{Extra}\end{aligned}$$

Tentative Course Outline

Chapter	Content	Textbook
1	Introduction: What is Statistics?	1.1-1.6
2	Probability	2.1-2.13
Exam 1		
3	Discrete Random Variables	3.1-3.9, 3.11-3.12
4	Continuous Random Variables	4.1-4.10, 4.12
Exam 2		
5	Multivariate Probability Distributions	5.1, 5.9, 5.11-5.12
6	Functions of Random Variables	6.1-6.8
Exam 3		