

## Syllabus for Stat 6201: Mathematical Statistics

**Instructor:** Dr. Kubatko (“Dr. K”)

**Office:** 219 Cockins Hall

**Office Hours:** MWF 10:00-11:00am, other times by appointment

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**Course meeting times and locations:** MWF 8:00-9:15am, 175 Mendenhall Lab

**Required Text:** Probability and Statistics, Fourth Edition, by Morris H. DeGroot and Mark J. Schervish, Pearson Education, 2012

**Prerequisites:** MATH 2153 (multivariable differential and integral calculus) or permission of instructor. This course is not open to students with credit for STAT 6301.

**Website:** Please visit <http://www.carmen.osu.edu/>. Check periodically for announcements about the class and other class material.

**Course Description:** Statistics 6201 offers an introduction to some of the core concepts from probability theory and statistical inference. Topics covered include probability, random variables, expectation, moment generating functions, discrete and continuous distributions, limit theorems, maximum likelihood and Bayesian estimation, confidence intervals, hypothesis tests, Neyman-Pearson lemma, t and F tests.

### **Evaluation:**

Homework - 20%

Exam I - 25%

Exam II - 25%

Final exam - 30%

**Homework:** Homework will be assigned regularly. Late assignments will NOT be accepted. Students are required to write clear and detailed answers to all homework problems. You are encouraged to discuss homework problems with other students but you have to prepare and present your own solutions. Feel free to ask me for help after you have made an attempt to solve the problems. Do not copy any part of a homework.

**Exams:** There will be two midterms and one final exam. All exams are in-class and closed book. For each exam (including the final exam) you are allowed to bring two 8.5”x11” sheets of handwritten notes (both sides) and a scientific calculator (something similar to a TI-83). You will not be allowed to use your cell phone, tablet, laptop, smart watch, or any other device with capability to connect to the Internet, or to other devices. The final exam will be comprehensive. Statistical tables will be provided for all exams as needed.

**Makeup exams:** If you absolutely need a makeup exam and have a valid excuse, please see me for the necessary arrangements. However, you must notify me in advance in such a situation. A make-up exam must be taken within a week of the missed exam. Exceptions to this policy will be permitted only in extreme situations such as serious injury immediately prior to an exam or severe illness requiring hospitalization.

**Full credit on homework and exam problems:** You need to show your justification for work on each homework or exam problem. Answers without work will not receive full credit.

**Course attendance policy:** You are expected to attend all lectures and recitations. Formal attendance records will not be kept, however, students are responsible for all material covered in class. Office hours should not be used for instruction on material that has already been covered in class.

**Academic Misconduct:** It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term “academic misconduct” includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5- 487). For additional information, see the Code of Student Conduct ([http://studentaffairs.osu.edu/info\\_for\\_students/csc.asp](http://studentaffairs.osu.edu/info_for_students/csc.asp)).

In particular, please note that although students are encouraged to work together on homework assignments, all students must submit their own written work **IN THEIR OWN WORDS**.

**E-mail Correspondence:** In order to protect your privacy, all course e-mail correspondence must be done through a valid OSU name.nn account. If you have not activated your OSU email account, you can activate your account at <https://acctmgmt.service.ohio-state.edu/cgi-bin/KRB1EntryAdd>.

**Special Accommodations:** Students with disabilities that have been certified by the Office for Disability Services will be appropriately accommodated, and should inform the instructor as soon as possible of their needs. The Office for Disability Services is located in 150 Pomerene Hall, 1760 Neil Avenue; telephone 292-3307, TDD 292-0901; <http://www.ods.ohio-state.edu/>.

## Tentative Schedule

Lecture No.	Date	Topic	Textbook Readings
1	8/23/17	Intro to probability	1.1-1.4
2	8/25/27	Sample space, events	1.5-1.6
3	8/28/17	Counting, combinatorics	1.7-1.8
4	8/30/17	Combinatorics, multinomial coefficients	1.8-1.9
5	9/1/17	Unions of events	1.10
	9/4/17	LABOR DAY - NO CLASS	
6	9/6/17	Conditional probability and independence	2.1-2.2
7	9/8/17	Independence, Bayes theorem	2.2-2.3
8	9/11/17	Review of Chapters 1 and 2	
9	9/13/17	Random variables and discrete distributions	3.1
10	9/15/17	NO CLASS	
11	9/18/17	Continuous distributions, cdfs	3.2-3.3
12	9/20/17	Bivariate distributions	3.4
13	9/22/17	Conditional and marginal distributions	3.5-3.6
14	9/25/17	Multivariate distributions	3.7
15	9/27/17	Functions of a random variable	3.8
16	9/29/17	Functions of two or more random variables	3.9
17	10/2/17	<b>EXAM #1*</b>	Chapters 1 - 3
18	10/4/17	Expectation	4.1-4.2
19	10/6/17	Variance	4.3
20	10/9/17	Moments, Means, Medians	4.4-4.5
21	10/11/17	Covariance and correlation	4.6
	10/13/17	FALL BREAK – NO CLASS	
22	10/16/17	Conditional expectation	4.7
23	10/18/17	Bernoulli and Binomial distributions	5.1-5.2
24	10/20/17	Hypergeometric and Poisson distributions	5.3-5.4
25	10/23/17	Negative Binomial and Normal distributions	5.5-5.6
26	10/25/17	Normal and Gamma distributions	5.6-5.7
27	10/27/17	Beta and Multinomial distributions	5.8-5.9

28	10/30/17	Bivariate normal distribution	5.10
29	11/1/17	Law of large numbers	6.1-6.2
30	11/3/17	Central limit theorem	6.3
31	11/6/17	<b>EXAM #2*</b>	Chapters 4-6
32	11/8/17	Statistical inference, maximum likelihood	7.1, 7.5
	11/10/17	VETERAN'S DAY – NO CLASS	
33	11/13/17	Maximum likelihood	7.5-7.6
34	11/15/17	Bayesian estimation	7.2-7.4
35	11/17/17	Bayesian estimation	7.2-7.4
36	11/20/17	Sampling distributions, $\chi^2$ distribution	8.1-8.2
	11/22/17 - 11/24/17	THANKSGIVING BREAK – NO CLASS	
37	11/27/17	t distribution, confidence intervals	8.4-8.5
38	11/29/17	Unbiased estimation	8.7
39	12/1/17	Intro to hypothesis testing, simple hypotheses	9.1-9.2
40	12/4/17	t-tests, comparing two means	9.5-9.6
41	12/6/17	<b>Course summary &amp; review</b>	All material

\*Please note that exam dates are tentative and may be adjusted depending on the pace of the course.  
**FINAL EXAM:** Monday, December 11, 8:00 - 9:45am