

STAT 4202: Introduction to Mathematical Statistics II
Hagerty Hall 180
MWF 3:00 – 3:55

The Ohio State University, Autumn 2016

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Office Hours: MWF 10:30 – 11:30 or by appointment

Recitation Instructor: Hancong Tang
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Course Description: Decision theory, point and interval estimation, Neyman-Pearson lemma, likelihood ratio tests, tests for means, variances, and proportions, nonparametric tests, regression, and ANOVA

Prerequisite: STAT 4201 (420), MATH 4530 (530), or MATH 5530H (531H), or permission of the instructor. Not open to students with credit for 6201 (520), 6302 (623), 6802 (621 and 622), or STAT 4202.

Textbook: *John E. Freund's Mathematical Statistics with Applications*, 8th Edition, by I. Miller and M. Miller

Topics: We will be covering chapters 9 (Decision Theory), 10 (Point Estimation), 11 (Interval Estimation), 12 (Hypothesis Testing), 13 (Tests of Hypothesis Involving Means, Variances, and Proportions), 14 (Regression and Correlation), part of chapter 15 (Design and Analysis of Experiments), part of chapter 16 (Nonparametric Tests).

Website: The course website is carmen.osu.edu; please check it regularly. On the site you will find announcements, the syllabus, homework assignments, and solutions.

Important Dates: The last day to drop a course is Friday, September 16th. The last day to withdraw from a course without petitioning is Friday, October 28th. There will be no class Monday, September 5th (Labor Day), Friday, October 14th (Autumn Break), Friday, November 11th (Veterans Day), Wednesday, November 23rd (Thanksgiving Break).

Attendance: While I will not be taking attendance, you are expected to attend every class session. If you miss class then it is your responsibility to get any and all material covered from a classmate. Arriving late or leaving early is distracting to you, your classmates, and me and will not be tolerated.

Electronic devices: Use of communication devices and technology for activities other than class work disrupt the learning process for you and others in the class and is not permitted. Cell phones and other electronic devices should be turned off or silenced during class.

Evaluation:

Homework	20%
Quizzes	20%
Exam 1 (Friday, September 30 th)	20%
Exam 2 (Friday, November 4 th)	20%
Final Exam (Thursday, Dec. 15 th 2:00 – 3:45)	20%

There will be a quiz and/or a homework assignment due in recitation each week except the first week and exam weeks. The dates for the exams are tentative and I reserve the right to change the dates of any and all assessments; at least one week of notice will be provided in case of a change. You may bring one 8.5" by 11" sheet of paper (both sides) with whatever **handwritten** facts, formulas, notes, and/or examples you deem helpful. For the comprehensive final, you may bring two such sheets. All assessments must be completed in pencil. Late homework will not be accepted and no makeup quizzes or exams will be given. Please note that solutions, not answers, will be graded; a correct answer alone will not get full credit if the steps leading to it are not clear and/or correct. The grading scale will be no harsher than the following scale (please note that I reserve the right to give +/- as justified.):

A	B	C	D	E
≥ 90%	80% – 89%	70% – 79%	60% – 69%	< 60%

Calculators: At my discretion, students may be prohibited from using calculators on some assessments. Please note that at no time will you be permitted to use a calculator with a CAS.

Accommodation: The University strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability (including mental health, chronic or temporary medical conditions), please let me know immediately so that we can privately discuss options. You are also welcome to register with Student Life Disability Services to establish reasonable accommodations. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. (**SLDS contact information:** slds@osu.edu; 614-292-3307; slds.osu.edu; 098 Baker Hall, 113 W. 12th Avenue.)

Academic Misconduct: Please help us to maintain an academic environment of mutual respect, fair treatment, and personal growth. You are expected to produce original and independent work for exams and homework. Although students are often encouraged to work together on homework assignments, all students must submit their own written work in their own words. 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 at <http://studentlife.osu.edu/csc/>.

Final Comment: It is crucial that we have a mutual respect for one another as members of the OSU community and that we conduct ourselves accordingly. My responsibilities include coming to class prepared to teach you statistics, giving clear lectures, assigning carefully chosen homework problems that are relevant to our course, and carefully preparing quiz and exam questions that accurately measure your progress in the course. Additionally, I am responsible to be available to you outside of class for consultation in office hours and by appointment. Likewise, I expect you to come to class motivated to learn the material. This involves reading the material ahead of time, promptly starting the homework assignments, and seeking additional help before it is too late. Ultimately, you are responsible for your university education and what you take from it.

Date	Lecture Topic	Textbook Reading
8/24	Introduction; Review of 4201 topics	
8/26	Introduction to Decision Theory; Statistical Games	9.1 – 9.3
8/29	Decision Criteria; The Minimax Criterion; The Bayes Criterion	9.4 – 9.6
8/31	Introduction to Point Estimation; Unbiased Estimators	10.1, 10.2
9/1	Efficiency	10.3
9/5	No Class; Labor Day	
9/7	Consistency	10.4
9/9	Sufficiency; Robustness	10.5, 10.6
9/12	Method of Moments Estimation	10.7
9/14	Maximum Likelihood Estimation	10.8
9/16	Maximum Likelihood Estimation	10.8
9/19	Introduction to Interval Estimation; Estimation of Means	11.1, 11.2
9/21	Estimation of the Difference of Two Means	11.3
9/23	Estimation of proportions; Estimation of the Difference of Two Prop's	11.4, 11.5
9/26	Estimation of Variances; Estimation of the Ratio of Two Variances	11.6, 11.7
9/28	Review for Exam 1	
9/30	Exam 1 (9.1 – 11.7)	
10/3	Introduction to Hypothesis Testing; Testing Statistical Hypotheses	12.1, 12.2
10/5	The Neyman-Pearson Lemma	12.4
10/7	The Neyman-Pearson Lemma; Power of a Test	12.4, 12.5
10/10	Likelihood Ratio Tests	12.6
10/12	Likelihood Ratio Tests	12.6
10/14	No Class; Autumn Break	
10/17	Tests Concerning Means	13.1, 13.2
10/19	Tests Concerning the Difference of Two Means	13.3
10/21	Tests Concerning Variances	13.4
10/24	Tests Concerning Proportions	13.5
10/26	Tests Concerning Differences Among k Proportions	13.6
10/28	Analysis of $r \times c$ Tables	13.7
10/31	Goodness of Fit	13.8
11/2	Review for Exam 2	
11/4	Exam 2 (12.1 – 13.8)	
11/7	Linear Regression	14.1, 14.2
11/9	Least Squares Estimation	14.3
11/11	No Class; Veterans Day	
11/14	Normal Regression Analysis	14.4
11/16	Normal Correlation Analysis	14.5
11/18	Multiple Linear Regression	14.6
11/21	Design and Analysis of Experiments	15.1, 15.2
11/23	No Class; Thanksgiving Break	
11/25	No Class; Thanksgiving Break	
11/28	One-Way ANOVA	15.2
11/30	Introduction to Nonparametric Statistics; The Sign Test	16.1, 16.2
12/2	The Signed Rank Test	16.3
12/5	Rank Sum Tests: The U Test; Rank Sum Tests: The H Test	16.4, 16.5
12/7	Review for Final Exam	
12/15	Comprehensive Final Exam 2:00 – 3:45	