

MATH 430 (FALL 2017)
MATHEMATICAL STATISTICS I

COURSE OUTLINE

Instructor Information:

Name: Jin-Hong Park

Office: Room 351 Robert Scott Small

Email: parkj@cofc.edu

Office Hours: 4-5PM (Tuesday), 3-4PM (Wednesday), or by appointment

Course Meeting: Tuesday and Thursday, MYBK 108, 5:30 - 6:45PM

Course Description:

This is a calculus-based probability and statistics course. Topics include probability, probability functions, probability densities, mathematical expectation, sums of random variables and sampling distributions.

Student Learning Outcomes:

After completing this course, students will be able to

1. Explain the importance of the statistical theory in the development of the tools of statistical inference.
2. Recognize the connection between classical and non-classical statistical theory for inference.
3. Demonstrate an understanding of mathematical proofs in the development of mathematical statistical theory.
4. Implement the statistical package R to work with statistical models.

These outcomes will be assessed on the four in-class tests and final exam.

Undergraduate Mathematics Program Learning Outcomes:

Students are expected to display a thorough understanding of the topics covered. In particular, upon completion of the course, students will be able to

1. Using algebra, geometry, calculus and other track-appropriate sub-disciplines of mathematics, students model phenomena in mathematical terms.
2. Using algebra, geometry, calculus and other track-appropriate sub-disciplines of mathematics, students derive correct answers to challenging questions by applying the models from Learning Outcome 1.
3. Write complete, grammatically and logically correct arguments to prove their conclusions.

These outcomes will be assessed on the four in-class tests and final exam.

Accommodations for Students with Disabilities:

If there is a student in this class who has a documented disability and has been approved to receive accommodations through the Center for Disability Services/SNAP (Students Needing Access Parity), please come and discuss this with me during my office hours.

College Honor Code:

Any violation of the College's Honor Code will be reported to the Honor Board. For more details, see <http://studentaffairs.cofc.edu/honor-system/> and the Student Handbook at <http://studentaffairs.cofc.edu/honor-system/studenthandbook/>

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Course Objectives:

This course aims to provide a solid foundation in statistical theory and an indication of the relevance and importance of the theory in solving practical problems in the real world. Students will learn how to use specific statistical distributions and general modes of statistical thinking to make inferences from data, and to support an argument with quantitative information. Students will learn the mathematical and probabilistic underpinnings of statistical theory, which is essential for understanding and properly applying statistical techniques used in other fields such as economics, biology, engineering, social science, and so on. By the end of the course, students will be able to apply a wide variety of probability distributions, and solve practical problems through statistical and probabilistic reasoning. In addition, they will be able to prove theorems relating to the content of the course, provide written explanations of the ideas behind statistical concepts, and will have improved their skills at solving complex and multi-step problem.

Textbook: *Mathematical Statistics with Applications*, Wackerly, Mendenhall and Sheaffer (Duxbury), 7th Edition

Course topics:

Probability (Ch. 2)

Discrete random variables and their probability distribution (Ch. 3)

Continuous variables and their probability distribution (Ch. 4)

Multivariate probability distribution (Ch. 5)

Function of random variables (Ch. 6)

Sampling distributions and the central limit theorem (Ch. 7)

Calculator: Any calculator except for TI-83 or above.

Requirement: (NO MAKE-UP)

1. Homework^{*}
2. Quiz (20%) and Project (Extra Credits)^{**}
3. Four in-class tests (20% each) and Final Exam (20%)^{***}

A: 90 or above; A-: 87-89; B+:83-86; B: 80-82; B-: 77-79; C+:73-76; C: 70-72; C-: 67-69;
D+: 63-66; D: 60-62; D-:57-59; F: 56 or below

^{*} *Homework problems are all examples in the textbook. It is expected that you study by yourself at home. Not required to submit but an important course materials for Quiz, Test, and Final.*

^{**} *There are 30 minutes quizzes, whose date will not be announced in advance. I STRONGLY recommend bring your calculator to all classes. Your lowest quiz will be dropped. Hence, a make-up quiz is not necessary. The short projects are take-home assignment problems.*

^{***} *Each test is 20% of your course grade. Final Exam is a comprehensive test. You may drop the final if you are satisfied with all your tests. Nevertheless, you cannot drop one of tests without an official excuse. I do NOT plan on giving make-up tests.*

Attendance Policy:

1. Full participation in all classes is expected.
2. A student who misses five classes^{*} will get F in this course.
3. If you are more than 10 minutes late or leave earlier, it will be counted as an absence.

^{*} *It includes excused absences. So, you are not required to submit an excuse document or college absence memo.*

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Midterm Policy:

Instructor strongly recommends withdrawing this course if your midterm grade is less than 60%.

Important Dates:

August 28: Last day of drop/add

September 12: Test 1

October 5: Test 2 (covers the first half)

October 17: Fall Break (no class)

October 26: Last day for students to withdraw with a W

November 2: Test 3

November 23: Thanksgiving (no class)

November 30: Test 4 (covers the second half)

December 8: Final Exam (5:30 – 7PM)* (~~College schedule: Dec. 12 at 7:30 – 10:30PM~~)

* If this schedule conflicts with yours, please contact me by August 31.

NOTE:

1. I will utilize email to send the course materials and announce the important schedules fairly often. Therefore it is important that you check your email regularly. I encourage you to contact me via email if you have a question that does not require an office hour visit.
2. The course syllabus is a general plan for the course; deviations announced to the class by the instructor may be necessary.
3. The last test and final will not be returned to you based on college policy.