

Bulletin Preview

[ES] [IS] **STAT 218. Introduction to Statistics** (3 cr) Lec 3. Prereq: Removal of all entrance deficiencies in mathematics. *Credit toward the degree may be earned in only one of: CRIM 300 or ECON 215 or EDPS 459 or SOCI 206 or STAT 380.*

The practical application of statistical thinking to contemporary issues; collection and organization of data; probability distributions, statistical inference, estimation and hypothesis testing.

This response describes opportunities students have to learn the knowledge and skills addressed by the outcome (SLO3).

ACE Certification

In its review of requests for ACE certification, the Interim ACE committee (eventually the UCC ACE subcommittee) will use such criteria as:

- Does the course clearly address the Learning Outcome(s) identified?
- Does the course provide students with opportunities to develop the knowledge/skills necessary for successful achievement of the Learning Outcome(s)?
- Does the course provide students with opportunities to demonstrate achievement of the Learning Outcome(s)?
- Does the course reinforce at least one of the following as appropriate for the discipline and as identified by the department offering the course: Writing, Oral Communication, Visual Literacy, Historical Perspectives, Mathematics and Statistics, Critical Thinking, Teamwork, Problem Solving, Ethics, Civics, Social Responsibility, Global Awareness, or Human Diversity?
- Have the hosting department/unit and the instructor(s) agreed to follow through with their responsibilities as outlined in the ACE Course Certification Request Form?

Students select which one outcome they will receive ACE credit for. Faculty should indicate which one or two ACE Learning Outcome(s) are satisfied by the course.

SLO3. Use mathematical, computational, statistical, or formal reasoning (including reasoning based on principles of logic) to solve problems, draw inferences, and determine reasonableness.

Describe opportunities students should have to learn the outcome. How is the learning objective embedded in the course?

The goal of this course is to take students with minimal prior exposure to statistical reasoning to a place where they could draw appropriate conclusions from data. A successful student in this course will have the numerical literacy skills necessary to objectively evaluate data-driven conclusions presented in popular media. To achieve this goal, STAT 218 covers three major subject areas, all of which build on each other: data collection, descriptive statistics, and statistical inference. Data collection focuses on strategies for collecting the appropriate data to answer a specific, testable question. As part of this process, a student needs to be able to formulate a question in the form of a testable hypothesis and identify the population from which to draw the data to test their hypothesis. Descriptive statistics focus on summarizing data in a meaningful way. This includes both numerical and graphical summaries. The student will learn which summaries are appropriate for different types of data, and for answering the specific hypothesis posed. They also use these data summaries to determine if particular data points could reasonably be expected. Statistical inference focuses on using the data collected and the descriptive statistics calculated to draw conclusions to the population of inference. Students must select the appropriate statistical procedure based on the data they collected and the hypothesis being tested.

Question 1 response continues on page 2

Students must determine if the data they collected/observed is reasonable under the assumptions of the procedure and the hypothesis. Once they have determined reasonableness, they draw appropriate inferences based on their conclusions.

Describe student work that will be used to assess student achievement of the outcome.

This response does a good job of explaining **how** the graded work allows students to demonstrate the knowledge and skills specified by the outcome.

Student learning will be assessed via traditional homework and tests. There will be either two or three hourly exams (depending on instructor) and a final exam. On the final exam, students are given a data set (already collected) and a description of a scientific problem. The students must formulate appropriate hypotheses, carry out the appropriate statistical procedure and draw conclusions based on their results. Students will also participate in hands-on classroom activities. In groups, they formulate a testable hypothesis, determine how to collect data to answer that question, collect the data, test their hypotheses and draw appropriate conclusions.

This response explains what the assessment process will be, indicating that the department has a plan for gathering & reviewing student evidence for assessing achievement of the outcome.

As part of the ACE certification process, the department/unit agrees to collect and assess a reasonable sample of students' work and provide reflections on students' achievement of the Learning Outcomes for its respective ACE-certified courses. Please comment on your plans to develop a process to collect and evaluate student work over time for the purpose of assessing student success for this ACE outcome.

Every semester, there are about 15 sections of STAT 218. We will collect a random sample of at least three final exams from each section, and the Statistics Curriculum Committee will provide reflections on student achievement. We will archive a representative sample of final exams from this collection, as well as the curriculum committee's reflections. A library of hands-on activities used in the classroom will be maintained for instructor use and assessment.

What Outcome(s) or skill(s) will be reinforced in this course?

According to the ACE document approved by faculty (Structural Criteria, item 9), "Every ACE course will reinforce at least one of the following skills listed below as appropriate for the discipline and as identified by the department offering the course..." Indicate skills that will be reinforced by the course by clicking on as many as apply and describe briefly how those skills will be reinforced.

These areas are those *OTHER THAN* the one or two outcomes for which you seek ACE certification. Students will not receive ACE credit for the reinforced skills, and the reinforced skills do not need to be assessed for ACE purposes.

Note: This example does **not** indicate that Mathematics & Statistics will be reinforced. A course should reinforce one or more skills or knowledge areas that are not addressed by the outcome(s) for which it is being certified.

Writing

Describe briefly how this skill will be reinforced.

An important component of this course is to teach students to communicate the results of their analysis to those unfamiliar with statistics. That is, to translate their results from "stat-speak" into English. Different instructors assess this skill in different ways. Typically instructors have the students complete an end-of-course project, in which the students must write a paper detailing the scientific question they tested, how they collected the data, the statistical analysis, and their conclusions. Other instructors have their students write critiques of popular articles that mention statistical results.

Critical Thinking

Describe briefly how this skill will be reinforced.

Critical thinking is an integral part of the subject matter of statistics. Hypothesis testing requires students to identify the real world problem being investigated, to identify and use the appropriate statistical procedures, and finally to draw conclusions from the statistical results. There is considerable emphasis on how statistical decision making is used in the real world. The students are required to show their work so the instructor can follow their thought processes. Moreover, students need to demonstrate their understanding of the assigned problems and express their conclusions in writing. One aspect which is emphasized is the ability to critically analyze published results based upon the data presented.

Supportive Material

Syllabus (Required)

[syllabus--ace.doc](#)

Attach a copy of the sample syllabus that clearly identifies:

- The Learning Outcome(s) that are satisfied by the course.
- A brief description of the opportunities this course provides students to acquire the knowledge or skills necessary to achieve the Learning Outcome(s)
- A brief description of the graded assignments that the instructor(s) uses to assess the students' achievement of the Outcome(s).

Cross-list Memo (Required if applicable)

Additional Documentation (Optional)