

Statistics Undergraduate Learning Outcomes Assessment Report

Academic Year: 2015-2016

Course: Stat 441

Semester: Spring 2016

Instructor: John Borkowski

Assessment Results:

According to the below description of Learning Outcomes and Assessment Contexts, 7 students were assessed for Outcomes 1 through 4 using signature assignments from STAT 441.

Outcome 1: On a course final project involving the *development* of an experimental design, two pairs students worked together and were rated “Excellent”, while three worked alone with two rated “Excellent” and one “Acceptable”.

Outcome 2: On a course final project involving the *execution* of an experimental design, two pairs students worked together and the three worked alone were all rated “Excellent”.

Outcome 3: On a course final project involving the *analysis* of experimental design data, two pairs students worked together and the three worked alone were all rated “Excellent”.

Outcome 4: On a course final project involving the *oral presentation* of experimental results, two pairs students worked together and were rated “Excellent”, while three worked alone with two rated “Excellent” and one “Acceptable”.

This satisfies our program learning objectives.

Comments based on assessments:

Faculty have reviewed the outcomes and determine the program is meeting the needs of students in this area.

Program Learning Outcomes

- 1) Given a scientific question, students will design an appropriate sampling plan or experimental design
- 2) Given a sampling plan or experimental design, students will be able to execute the plan or design.
- 3) Students will display competency in statistical computing.
- 4) Given a scientific question and information about the study design used to collect data, students will be able to conduct an appropriate statistical analysis
- 5) Students will be able to explain and interpret the results of a statistical data analysis in a written report, and in a way that is consistent with research question and study design.

Curriculum Map and Assessment Schedule

	Outcomes					Assessment Schedule
	1	2	3	4	5	
STAT 446 or STAT 441	X	X				AY odd years (2013-14, 2015-16,...)
STAT 408			X			AY odd years
STAT 411, 412, 436, 437, 439, or 448 (at least 2 courses will be used)				X	X	AY even years (2014-2015, 2016-2017, ...)

Rubric

Outcome 1: Given a scientific question of personal interest, propose an appropriate experimental design. Students could either work alone or with one partner.

Indicator: Design proposal in the signature assignment from Stat 441

Rubric:

- **Excellent** - The initially proposed design is feasible, statistically valid and directly addresses the scientific question.
- **Acceptable** - The initially proposed design has minor flaws and is revised, and the revision now satisfies the three criteria for excellence.
- **Marginal** - The revision of the initially proposed design is statistically valid but does not satisfy both of the other two criteria for excellence.
- **Unacceptable** - The proposed design is not statistically valid.

Threshold: On average, students will perform at an acceptable level or higher.

Outcome 2: Students will be able to execute the design in signature assignment from Stat 441

Indicator: Design execution in the signature assignment from Stat 441

Rubric:

- **Excellent** - The student collects the appropriate data according to the design.
- **Acceptable** - The student collects the appropriate data but fails to follow the design exactly. The failure to follow the design is a minor problem that does not invalidate the resulting data.
- **Marginal** - The student fails to follow the design in a minor way but the result is the data is not appropriate for the study.
- **Unacceptable** - The student fails to follow the design indicating they do not understand what the design is asking them to do. The resulting data is not appropriate for the study.

Threshold: On average, students will perform at an acceptable level or higher.

Outcome 3: Given a scientific question and data, students will be able to run and analyze the appropriate statistical analysis.

Indicator: Data analysis in the signature assignment from Stat 441

Rubric:

- **Excellent** - The student recognizes the best statistical method to use, chooses the correct approach to analyze the data, and arrives at the correct answer.
- **Acceptable** - The student does not recognize the best statistical method but chooses one that can be considered reasonable. They implement the method they have chosen correctly and arrive at the correct answer for their method.

- **Marginal** - The student may recognize the best statistical method or chose a sub optimal but appropriate method, however they implement the method they have chosen incorrectly and arrive at an incorrect answer.
- **Unacceptable** - The student fails to recognize any appropriate method for question and data. The implementation does not matter.

Threshold: On average, students will perform at an acceptable level or higher.

Outcome 4: Students will be able to explain and interpret the results of a statistical data analysis in an oral presentation.

Indicator: Oral presentation in the signature assignment from Stat 441

Rubric:

- **Excellent** - The oral presentation is clear and concise. It is correct in terms of the statistical results, scope of inference, and vocabulary.
- **Acceptable** - There may be minor flaws in terms of the statistical results, scope of inference, and vocabulary, but nothing that invalidates the conclusions. It may not be concise but the oral presentation is easily understandable.
- **Marginal** - There may be flaws in terms of the statistical results, scope of inference, and vocabulary that invalidates some of the conclusions. The student displayed an understanding of what needed to be done but the execution was flawed. The oral presentation may ramble .
- **Unacceptable** - Major flaws in terms of the statistical results, scope of inference and vocabulary which invalidate the conclusions or the oral presentation is incoherent. The student did not display an understanding of what needed to be done.

Threshold: On average, students will perform at an acceptable level or higher.