CCN STAT Subcommittee Memo on STAT 243Z Course Learning Outcomes

MEMORANDUM

TO: Transfer Council

FROM: Joseph Reid, Chair of CCN Statistics Subcommittee

DATE: February 14, 2022

SUBJECT: STAT 243Z course learning outcomes, revised

On January 19, 2023, Transfer Council conditionally approved STAT 243Z, asking that the subcommittee consult with an assessment expert for the purpose of reducing the number of course learning outcomes/objectives. Originally, the course had five learning outcomes with 14 objectives, or *subpoints* listed under each outcome. Transfer Council asked that HECC staff identify one or more individuals with outcomes and assessment expertise, for the purpose of advising the Statistics Subcommittee on this work. With guidance from Transfer Council Co-chairs Teresa Rivenes and Susan Jeffords, two people were identified as having extensive experience with outcomes and assessment: Ann Cary, from Portland Community College; and Kristin Nagy Catz, from Oregon State University.

On January 27, Chair Reid and Ann Cary met to discuss options for working with the STAT Subcommittee to revise course learning outcomes for STAT 243Z. On February 14, the subcommittee met to discuss separating course learning outcomes from objectives. Ann suggested removing the objectives and listing them *after* outcomes, as *content* with a note of introduction, stating that content serves as information with "*a shared understanding of the skills and concepts that must be covered in this course*." It is the subcommittee's intent that this information be required for institutions and included with course learning outcomes.

While course learning outcomes describe or list measurable and essential mastered content knowledge, course content addresses important themes, concepts, issues, and skills needed to achieve outcomes. The following chart provides a summary of the Subcommittee's recommendation to revise the course learning outcomes for STAT 243Z. Note: none of the language of the original course learning outcomes has been altered. Instead, the five outcomes have been separated from the course content, to differentiate between outcomes and course content more accurately. For clarity, the five outcomes are also listed *under* course content, to clearly connect content with the outcomes related to relevant information. The vote tally for revising course learning outcomes: Yes, 12; No, 1; Abstain, 0.

Recommendation
Statistics
Course Number and Prefix: ST or STAT (or similar statistics prefix; not math) 243Z
Course Title: Elementary Statistics I
Course Credits: 4 credits

Course Description:

A first course in statistics focusing on the interpretation and communication of statistical concepts. Introduces exploratory data analysis, descriptive statistics, sampling methods and distributions, point and interval estimates, hypothesis tests for means and proportions, and elements of probability and correlation. Technology will be used when appropriate.

Learning Outcomes:

Students will be able to:

1. Critically read, interpret, report, and communicate the results of a statistical study along with evaluating assumptions, potential for bias, scope, and limitations of statistical inference.
2. Produce and interpret summaries of numerical and categorical data as well as appropriate graphical and/or tabular representations.
3. Use the distribution of sample statistics to quantify uncertainty and apply the basic concepts of probability into statistical arguments.
4. Identify, conduct, and interpret appropriate parametric hypothesis tests.
5. Assess relationships in quantitative bivariate data.

Required Course Content:

In order to ensure alignment across institutions, faculty needed to develop a shared understanding of the skills and concepts that must be covered in this course. Each institution is responsible for ensuring that faculty have access to this outline to inform course content.

1. Critically read, interpret, report, and communicate the results of a statistical study along with evaluating assumptions, potential for bias, scope, and limitations of statistical inference.
    a. Classify study designs and variable types and identify methods of summary and analysis.
2. Produce and interpret summaries of numerical and categorical data as well as appropriate graphical and/or tabular representations.
    a. Identify patterns and striking deviations from patterns in data.
    b. Identify associations between variables for bivariate data.
    c. Apply technology to calculate statistical summaries and produce graphical representations.
3. Use the distribution of sample statistics to quantify uncertainty and apply the basic concepts of probability into statistical arguments.
    a. Interpret point and interval estimates.
4. Identify, conduct, and interpret appropriate parametric hypothesis tests.
    a. Identify the appropriate test based on variable type.
    b. Identify situations where a one or two tailed test would be appropriate.
    c. Conduct tests of one mean.
    d. Conduct tests of one proportion.
    e. Explain the distinction between statistical and practical significance and the potential for error in hypothesis test conclusions.
    f. Apply technology to perform hypothesis tests calculations.
5. Assess relationships in quantitative bivariate data.
    a. Address questions relating correlation as a linear association between variables.
    b. Distinguish between correlation and causation within data.
    c. Apply technology to explore bivariate data.

Review Cycle Recommendation:

The Subcommittee will meet to review objectives for STAT 243 in **Spring 2025**.

- Implementation of changes to course content will not be in place until Fall 2023.
- Stakeholder feedback will be critical in evaluating how these changes have impacted the courses where STAT 243Z serves as a prerequisite. Such data will not be available until the year after initial implementation.
- Departments should contact these programs within their schools and search for feedback prior to review of topics in Spring 2025 in order to adjust the course.
- Review of deferred topics will be addressed at the behest of Transfer Council at a later date.

The CCN Statistics Subcommittee requests that Transfer Council accept these proposed revisions as the final version of course learning outcomes for STAT 243Z.

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Members of the CCN Statistics Subcommittee