Boise State's Foundational Studies Program provides undergraduates with a broad-based education that spans the entire university experience. *MATH254: Introduction to Statistics* satisfies three credits of the Foundational Studies Program's Disciplinary Lens-Mathematics (DLM) requirements. It supports the following University Learning outcome (ULO) along with a variety of other course specific goals.

ULO 7: *Apply knowledge and methods of reasoning characteristic of mathematics, statistics, and other formal systems to solve complex problems.*

MATH254: Introduction to Statistics is designed to engage students in the ways in which information (data) are collected, analyzed and interpreted assisted by statistical software. This course helps to achieve the goals of the Foundational Studies Program by focusing on the following course learning outcomes. After successful completion of this course, you will be able to:

1. Identify appropriate descriptive and inferential techniques to be used in given situations.
2. Apply statistical techniques to real data and interpret the results of estimation, hypotheses testing and regression.
3. Use a conventional computer statistics package to perform the more common calculations of statistics.
4. Explain the role of probability in inferential statistics.
5. Report results of statistical analysis in a clear written form.
6. Identify fundamental assumptions necessary for use of specific statistical techniques.

Sample M254 semester curriculum:

Descriptive Statistics for single variable data   3 class days
      Categorical vs. quantitative data.
      Bar charts, pie charts, stem & leaf plots, histograms.
      Boxplots, quartiles, measures of center & spread.
      Using software (either crunchit or excel).

Introduction to the Normal Distribution   1 class day
      Properties of the Normal distribution, Z scores & standardization.
      Finding probabilities & percentiles (using statistical table).

Introduction to Regression Analysis   3 class days
      Scatterplots, correlation, least squares lines.
      Interpretation of r, r^2, making predictions, residual plots.
      Correlation vs. causation, software use.

Introduction to Bivariate categorical data: 2-way tables   2 class days
      Joint, marginal & conditional distributions.
      Simpson's paradox.

Data collection: Experiments & Observational studies   2 class days
      Importance of randomization, sample size & control in experiments.
      Random selection for observational studies, use of random number table.
      Bias vs. variability, ethics.

Introduction to probability   2 class days
      Equally likely outcomes, mutually exclusive and the addition property.
      Random variables, discrete probability distributions, revisit Normal Distribution.
      Expected value, the idea of independence.

Introduction to Sampling distributions   3 class days
      The Central Limit Theorem.
      Binomial Settings; using the normal approximation to the Binomial for proportions.

Introduction to Inference   6 class days
     The t-distribution.
     Confidence intervals for a single mean or proportion.
     Hypothesis tests for a single mean or proportion.
     How to choose the appropriate CI formula or test statistic; conditions required.
     Determination of sample size for given margin of error (z CI's only).
     Use of software for single sample CI's & HT's.

Further (optional) topics in Inference (using primarily stat software)   4 class days
     2-sample t-tests for differences in means (unequal variances).
     2-sample z-tests for differences in proportions.
     Hypothesis testing in regression: assessing the significance of a linear relationship.
     Chi-square test for independence.
     How to read/interpret statistical reports.

Review/Exams   4 class days

Note: Instructors usually do not have the time for all of the further topics, and the number of days available is anywhere from 0 - 4.