

# Statistics, B.S.

## Learning Outcomes

Students will:

- be able to distinguish between observational studies and designed experiments and understand the issues related to the data collection method, including sampling bias, sampling error, sample size determination, statistical power, association versus causation, and the design and analysis of randomized experiments;
- use critical thinking skills to translate substantive questions into well-defined statistical problems and choose appropriate statistical methods and graphical summaries for a given problem;
- use computer software to manage data, carry out exploratory data analyses and computer simulations, produce numerical and graphical summaries of data, and apply basic statistical methodology;
- be able to clearly communicate study results to non-statisticians, and write accurate and meaningful reports that describe the statistical analyses and summarize important findings; and
- understand the mathematical tools underlying statistical methods, including distribution theory, uncertainty quantification via probability, estimation theory, and the probabilistic basis of formal statistical inference.