STATISTICS, BS

LEARNING OUTCOMES

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1. Frame a scientific question with the appropriate mode of data analysis, to analyze such data correctly, and to summarize and interpret the results in a useful manner. Master a number of key statistical techniques, certainly including significance testing, goodness-of-fit testing, and regression analysis, which are common tools in analyzing data. This will include a careful checking of assumptions that underlie the techniques.

2. Design experiments/studies — in conjunction with scientists proposing the study — that will lead in an efficient manner to the collection of data that can be properly analyzed. Design studies with multiple factors taking variable reduction techniques into account. Interpret and critique designs they encounter in analyzing data.

3. Use tools from mathematical statistics and probability to assess the quality of point estimators, confidence intervals, and hypothesis tests. Demonstrate the skills to connect methods of application to their theoretical underpinnings.

4. Use a statistical language (with emphasis on R) to manipulate data and perform exploratory data analysis using basic statistical methods. Write structured R programs using conditional expressions, loops, and functions and to use regular expressions to extract data from text and make high-level visualizations.

5. Evaluate critically articles that use statistical argumentation. Assess whether or not the statistical arguments have been developed properly and the conclusions are reliable. If the arguments are not properly developed, they will be able to provide specific evidence for this.