ASA Guidelines for Undergraduate Statistics Programs

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http://www.amstat.org/education/curriculumguidelines.cfm
Executive summary: solve real-world problems

• Increased importance of data-related skills in modern practice
• More emphasis on teamwork, communications, and related experiences (e.g., internships, REUs, and capstones)
• Motivation: other disciplines have staked their claim
• As statisticians, we run the risk of becoming irrelevant if we don’t aggressively engage
Key changes: importance of data science

• Working with data requires extensive computing skills far beyond those described in the previous guidelines
• Students need facility with professional statistical analysis software, the ability to access and “wrangle” data in various ways, and the ability to utilize algorithmic problem-solving
• Students need to be able to be fluent in higher-level languages and be facile with database systems
Data-related topics

• Use of one or more professional statistical software environments
• Data analysis skills undertaken in a well-documented and reproducible manner
• Basic programming concepts (e.g., breaking a problem down into modular pieces, algorithmic thinking, structured programming, debugging, and efficiency)
• Computationally intensive statistical methods (e.g., iterative methods, optimization, resampling, and simulation/Monte Carlo methods)
Statistical practice

- Effective technical writing, presentation skills, and visualizations
- Practice with teamwork and collaboration
- Ability to interact with and communicate with a variety of clients and collaborators
Recommendations at the core of the guidelines

• Students need to be able to “think with data” (Lambert)
• Need multiple opportunities to analyze messy data using modern statistical practices
• Key theoretical concepts (design and confounding!) need to be integrated with data preparation, analysis, and interpretation
• Mathematical techniques play a lesser role (still important for people planning doctoral work in theoretical statistics)