

Module 0: Welcome to STA 602

Rebecca C. Steorts

Welcome!

Teaching Team

Instructor:

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Teaching assistants

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Course logistics

Lectures

Mondays and Wednesdays, 10:00 – 11:15 AM, Perkins 217

Labs

Lab 01: Thursday, 3:05 - 4:20 PM, Old Chemistry 116

Lab 02: Thursday, 4:44 - 5:55 PM, Social Sciences 136

What is Bayesian Statistics?

“Bayesian statistics is a theory in the field of statistics based on the Bayesian interpretation of probability where probability expresses a degree of belief in an event. The degree of belief may be based on prior knowledge about the event, such as the results of previous experiments, or on personal beliefs about the event. This differs from a number of other interpretations of probability, such as the frequentist interpretation that views probability as the limit of the relative frequency of an event after many trials.”^{*1}

¹Source: Wikipedia

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- ▶ Learn to effectively communicate results through written assignments and exams

Course topics

Bayesian methods

- ▶ Introduction to Bayesian methods
- ▶ Decision theory
- ▶ Hierarchical Models
- ▶ Introduction to Monte Carlo sampling
- ▶ Markov chain Monte Carlo (and sampling techniques)
- ▶ Metropolis and Gibbs sampling
- ▶ Multivariate Bayesian Models
- ▶ Bayesian Mixture Models
- ▶ Bayesian Regression Models

Course details

Pre-reqs

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- ▶ STA 210
<https://www2.stat.duke.edu/courses/Spring19/sta210.001/>
- ▶ STA 230 <https://www2.stat.duke.edu/courses/Fall18/sta230/>
- ▶ Linear algebra http://www.stat.columbia.edu/~fwood/Teaching/w4315/Fall2009/lecture_12
- ▶ R programming/github (STA 199)
<https://www2.stat.duke.edu/courses/Spring18/Sta199/>

Background knowledge

Statistical methods

- ▶ Linear and logistic regression
- ▶ Statistical inference
- ▶ Basic understanding of random variables

Computing

- ▶ Using R for data analysis
- ▶ Writing reports using Rmd
- ▶ Understanding of github
- ▶ Understanding reproducibility

Course toolkit

Course webpage:

<https://resteorts.github.io/teach/bayes-fall-25.html>

GitHub: github.com/modern-bayes

- ▶ Course information and course scheudle

Canvas

- ▶ Changes to Schedule
- ▶ Ed Discussion
- ▶ Homework uploads

Gradescope (link on course webpage)

- ▶ Homework uploads (make sure to upload to Canvas as well).

Ed Discussion (link on course webpage)

- ▶ Course discussion

Class Meetings

Lectures

- ▶ Some traditional lecture
- ▶ Derivations to go over together or in small groups
- ▶ Bring fully-charged laptop / tablet to use R

Labs (start first week of class)

- ▶ Continuation from class material
- ▶ Work on class assignments with TA support
- ▶ Time for clarifying questions regarding course material

Attendance is strongly expected (if you are healthy!); please check with another student if you do miss lecture or lab regarding material and announcements.

Computing toolkit

R and RStudio

- ▶ Install R and RStudio on your laptop

or

- ▶ Access RStudio through Docker container provided by Duke OIT
- ▶ Reserve a generic **RStudio** container (there is no course specific container)

Canvas and Gradescope

- ▶ All homework assignments will be uploaded to Gradescope and Canvas.
- ▶ Gradescope allows more fair and balanced grading.
- ▶ You must label your own pages on Gradescope to avoid any deductions of points.
- ▶ Canvas allows us to check the reproducibility of your work.
- ▶ Unfortunately, there is no platform that does both (to my knowledge).
- ▶ Feedback will be given in Gradescope and is individual and private.

Ed Discussion

- ▶ Online discussion forum (like Piazza, etc.)
- ▶ Platform to ask questions about course content, logistics, assignments, etc.
- ▶ Content organized by channels. Before posting, please browse previous posts to see if your question has already been answered. If not, please post your question in the relevant channel.
- ▶ Questions about grades, absences, and other private matters should be emailed to me with “STA 602” in the subject line.

Activities & Assessment

Homework (20%)

- ▶ 6 - 8 individual assignments
- ▶ Combination of derivations, conceptual questions, guided analyses, and open-ended analyses
- ▶ All homework grades will count toward your final grade.
- ▶ No late assignments will be accepted.

Quizzes (80%)

- ▶ 3 individual online quizzes
- ▶ Covers content since the previous quiz, including readings, lecture notes, in-class activities, and homework
- ▶ All quiz grades will count toward your final grade. No late assignments will be accepted.

Grading

Final grades will be calculated as follows

Category	Percentage
Homework	20%
Quizzes	80%

See the course syllabus for letter grade thresholds.

Course community

Course community

- ▶ Uphold the Duke Community Standard:
 - ▶ *I will not lie, cheat, or steal in my academic endeavors;*
 - ▶ *I will conduct myself honorably in all my endeavors;*
 - ▶ *I will act if the Standard is compromised.*
- ▶ Commit to respect, honor, and celebrate our diverse community
- ▶ Commit to being part of a learning environment that is welcoming and accessible to everyone

Accessibility

- ▶ The Student Disability Access Office (SDAO) is available to ensure that students are able to engage with their courses and related assignments.
- ▶ If you have documented accommodations from SDAO, please send the documentation within the first week to make sure all accommodations can be put in place as quickly as possible!
- ▶ I am committed to making all course activities and materials accessible. If any course component is not accessible to you in any way, please don't hesitate to let me know.

Support

- ▶ **Office hours** to meet with a member of the teaching team.
 - ▶ Find the course schedule on the course webpage
- ▶ **Ed Discussion** for questions about course logistics, content, and assignments
- ▶ **Email** for questions not appropriate for Ed Discussion, e.g., regarding personal matters or grades
 - ▶ Please put **STA 602** in the subject line

See the syllabus regarding additional academic and mental health and wellness resources.

Questions

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