

Syllabus

General Information

This course is listed under STAT 5454 “Reliability Theory” for the graduate version and under STAT 4984 “SS: Reliability Data Analysis” for the undergraduate version. The graduate version focuses more on methodology, and the undergraduate version focuses more on data analysis and applications.

Instructor: Yili Hong, Professor of Statistics

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Course Modality: Online–Asynchronous.

Class time: There is no scheduled meeting time for this class. Video lectures will be made available via the following Google Drive link (Sign in with your VT Email). Videos will be weekly uploaded by 9am on Tuesdays and Thursdays.

<https://drive.google.com/drive/folders/1W6ekq0LFRp4Lbn9zm8J8TTJe-It7Kafa?usp=sharing>

Office hours via Zoom: TR 3:00PM–4:00PM, or by appointment.

Zoom link for office hours: <https://viriniatech.zoom.us/j/83305740799>

Software: JMP. You may purchase JMP directly from Software Distribution.

<https://itpals.vt.edu/softwarelicensingcenter/studentsoftware.html>

R. We will do programming in R to implement some of the methods. It can be downloaded from,

<https://www.r-project.org/>

RSplida: An R package for reliability data analysis. Only works for 64 bit Windows. It can be downloaded from,

<https://wqmeeker.stat.iastate.edu/RSplida.zip>

Lecture Notes

Lecture notes will be provided based on the ongoing book project.

Hong, Y., Meeker, W. Q., and Pascual, F. G. (2022), *Advanced Statistical Methods for Reliability Data*, Wiley.

Description and Outline

This course aims to provide a comprehensive introduction to the principles and methods for the analysis of reliability data. Time-to-event data and degradation data are common from reliability studies in industrial and engineering settings as well as in material sciences. This course will cover statistical methods for lifetime data, recurrent

events data, degradation data, and test planning if time permits. As a master/upper undergraduate level course, the primary focus will be on methods, data analysis, and interpretation of results. The illustrative examples will be primarily from industrial and engineering settings.

Evaluation

- Letter grades will be given based on homework (50%) and the course project (50%).
- Homework: There will be regular homework. Students need to submit their homework online on Canvas.
- Project: Students are expected to complete a project in which they acquire and analyze a set of reliability data, write a comprehensive report, and give a presentation. Teamwork is encouraged.

Academic Integrity

Students are expected to abide by Virginia Tech's Community Standard for all work for this course (<http://www.honorsystem.vt.edu/>). Violations of the Standard will result in a failing final grade for this course and will be reported to the Dean of Students for adjudication. Ignorance of what constitutes academic dishonesty is not a justifiable excuse for violations.

Special Accommodation

As supported by Virginia Tech's Principles of Community (<http://www.vt.edu/diversity/principles-of-community.html>), all students will be treated equally. Those with special needs can be accommodated and should refer to the website <http://www.ssd.vt.edu/> for specific questions.