

SPRING 2021

**NC STATE
UNIVERSITY**

TE 589 / OR 591

Introduction to System Reliability Engineering

Dates: Jan 19, 2021 – Apr 30, 2021

Days & Times: Tue & Thu 3:00 pm – 4:15 pm

Course Delivery: Online

Instructor: Dr. Mengmeng Zhu

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Course Overview:

This course aims to provide a general study of reliability engineering with a focus on quantitative methods. Topics covered in this course include: reliability concepts, definitions, and measures, probabilistic failure models and parameter estimations, statistical life model of non-repairable system, Markov model based time-dependent reliability analysis, complex system reliability evaluation and optimization, reliability testing data collection and statistical analysis.

By the end of semester, students will be able to: 1) obtain hands-on experiences on collecting and analyzing reliability testing data with statistical distributions, 2) construct reliability block diagrams of complex systems and determine the failure modes of complex systems, 3) measure the importance of the components and determine the optimal system configuration based on system reliability, 4) apply these techniques to problems related to engineering systems.

Prerequisites: ST 370, ST 421, ST 501, ST 511, ST 515 or equivalent

Biography

Dr. Mengmeng Zhu is an Assistant Professor in the Department of Textile Engineering, Chemistry and Science and Associate Faculty Member in the Operations Research Graduate Program at North Carolina State University. She obtained her Ph.D. in Industrial and Systems Engineering at Rutgers University in October 2018 and her M.S. in Industrial and Systems Engineering and Statistics at Rutgers University in 2015 and 2016, respectively. She also has over six years of experience in industries including manufacturing, warehousing, and distribution center.

Dr. Zhu's research interests lie in computational data analytics and mathematical modeling for system reliability, resilience, and health monitoring and control. The applications of her research are on complex systems including smart health, energy, the Internet of Things, transportation, and software development. Dr. Zhu has published 11 papers in journals, such as Annals of Operations Research, IEEE Transactions on Computational Social Systems, Journal of Systems and Software, and has also published 4 conference papers.

Dr. Zhu serves on the Editorial Board of the 2nd Edition of Springer Handbook of Engineering Statistics. She serves as Editorial Board Member of the International Journal of Reliability, Quality and Safety Engineering. She serves on the International Program Committee of 2020 26th ISSAT International Conference on Reliability and Quality in Design. She also served as a Session Chair for the 25th ISSAT International Conference on Reliability and Quality in Design, Las Vegas, August 2019, the 24th ISSAT International Conference on Reliability and Quality in Design, Toronto, Canada, August 2018, and 2016 INFORMS Annual Meeting, Nashville.

Dr. Zhu is the recipient of the Best Paper Award of the 24th ISSAT International Conference on Reliability and Quality in Design 2019, Best Student Paper Award of the 23rd ISSAT International Conference on Reliability and Quality in Design 2018, and 2017 Chinese Government Award for Outstanding Self-Financed Students Abroad, respectively.