

# The University of Tennessee School of Natural Resources (SNR)

## 'Data Science Institute for Machine Learning and AI' (DSIMLA)

DSIMLA aims to promote and advance education and research in data science, machine learning, and AI for companies for the forest products industry. The Institute seeks to enhance the education and research of data science, machine learning, and AI for forest business and management companies. The goal of the Institute is to assist companies in learning, adapting, and effectively implementing the latest data science, machine learning, and AI technologies to optimize processes, leading to improved efficiency, utilization, energy savings, and cost reduction. The Institute will function as an expansion of a company's innovation group by providing access to the most current technologies in the rapidly evolving field of data science, machine learning, and AI.



The University of Tennessee, Knoxville is a public institution that was founded in 1794. It has a total undergraduate enrollment of 27,039 (fall 2022), its setting is city, and the campus size is 910 acres. It utilizes a semester-based academic calendar. University of Tennessee, Knoxville's ranking in the 2024 edition of Best Colleges is National Universities, #105. Its in-state tuition and fees are \$13,244; out-of-state tuition and fees are \$31,434. The University of Tennessee, Knoxville is a public research institution located in one of the state's largest cities, and is the flagship campus for the state school.

The School of Natural Resources is located in the University of Tennessee, Institute of Agriculture. The new MS Forest Business is open to students at UT and industry personnel willing to expand their education while working full-time, and will consist of a mostly virtual curriculum. The MS in Forest Business is a three-semester, non-thesis program that prepares students to assume leadership roles within forest industry in three separate tracks: Analytics & Data Science, Forestland Investment & Finance, and Logistics & Procurement.

# Data Analytics, Statistical Process Control, and Lean Methods

September 17-19, 2024

Offered by the

'Data Science Institute for Machine Learning and AI'



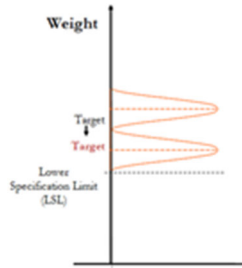
 THE UNIVERSITY OF  
TENNESSEE  
KNOXVILLE  
SCHOOL OF NATURAL RESOURCES

Instructor

Timothy M. Young, PhD

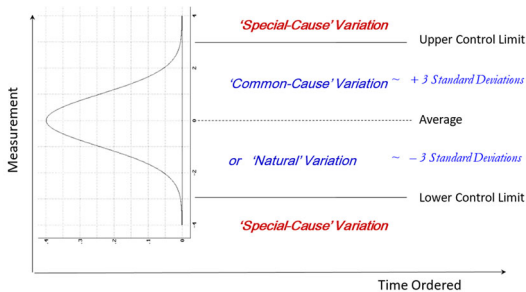
## Course Goal

The goal of the course is to enhance the students' knowledge of data analytics, SPC, and lean methods that lead to variation reduction and eliminating waste. The techniques taught in the course will directly benefit a company by lowering operational targets, which lower costs.



## Course Structure

The course is taught in two separate 40-hour sessions in a relaxed classroom setting. Participants enjoy the small class size of 12 to 16 students. Students are not required to bring a laptop, but exercises will be demonstrated in Excel, JMP and Minitab. Session I is 2 ½ days and typically runs from a Tuesday morning at 8:30 am EST through Thursday, which concludes that day at 12 pm EST. Session II is scheduled by the class typically 8 to 10 weeks after the conclusion of Session I. Students enjoy hands-on exercises such as Deming's Bead Box, Deming's Funnel Experiment, Quincunx (Variance is Cumulative), and group case studies.



## Course Outline (Sessions I & II)

- Introduction of Key Concepts
- Deming's Bead Box – Natural Variation
- SPC – Quantifying Variation
- Descriptive Statistics
- Control Charts & Run Tests
- Capability Analysis
- Data Quality Assessment
- Deming's Funnel Experiment
- Root Cause Analysis
  - Pareto Chart
  - Fishbone
  - Cause Mapping
- Correlation Analysis
- Simple Linear Regression
- Components of Variance
- Cost of Variation - Taguchi Loss Function
- Gage R&R
- Advanced Control Charting
  - Control Charts for Autocorrelated Data
  - EWMA Control Charts
  - CUSUM Control Chart
  - Multivariate Control Chart
  - Bulls-Eye Control Chart
- Toyota Production System (Lean Methods)
  - Gemba
  - 5S
  - SMED
  - Takt Time
  - OEE
  - Kanban
  - Jidoka
  - Poka-Yoke
  - Andon

*\*Exercises will be demonstrated in Excel, JMP, and Minitab software. Participants are encouraged to bring a laptop.*

## Course History

The course has been taught since 2001 to more than 75 companies and more than 1,000 participants. This includes many in-house customized courses for companies.

## 4.0 CEU Credit Offering

The course is available for 4.0 CEU credits and 3 graduate or undergraduate credits within The University of Tennessee system. This course meets 3 required credit hours for the MS Forest Business degree. The fees for CEU credits are included in course fee of \$3,850.

## 2023 Graduation Class



## Contact

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