Engineering Statistics Certification

Formats: On-site, online or hybrid
Duration: 40 hours
Purpose: Stand-alone certification

Certification overview

The Pyzdek Institute *Engineering Statistics Certification* covers a wide range of rigorous statistical methods used to develop new products, solve tough problems, reduce cost, acquire new process knowledge and improve Key Performance Indicators. The certification body-of-knowledge includes the application of the latest statistical methods for manufacturing, supply chain, services, healthcare and other industries.

Pre-requisites

This certification is numerically rigorous, and attendees should have experience with data analysis to at least Lean Six Sigma Green Belt level. The certification workshops are taught in either JMP®, Minitab® or SigmaXL® statistical software and attendees must have their own notebook computer and statistical software license.

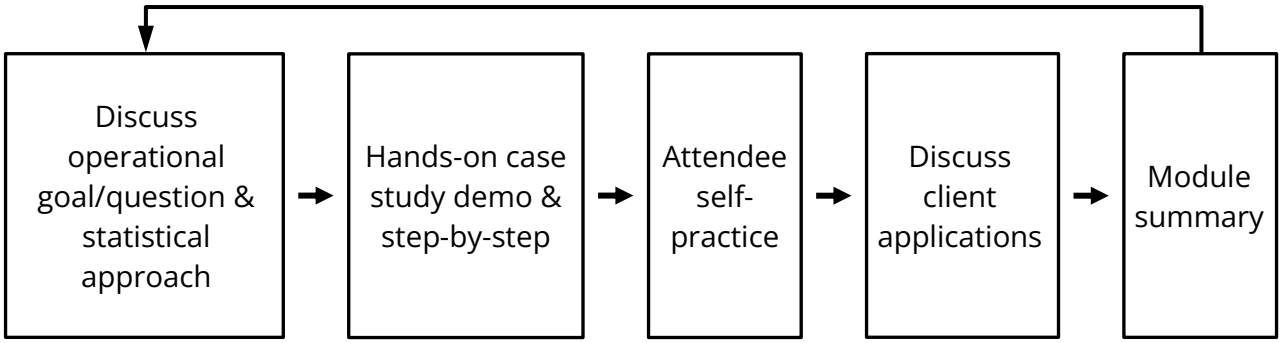
Certification details

This is not a tools-based certification. Instead, in 40 hours of class time, the attendees will understand the systematic application of three critical ***error-proofed workflows***:

- Measurement Systems Management
- Statistical Process Management
- Process Optimization

The workshop covers these three workflows with detailed practice using the best-available statistical methods along with the guidance needed to avoid common data analytics mistakes. Mastering these workflows and passing an optional exam are required to attain the coveted *Pyzdek Institute Engineering Statistics Certification*. Alternatively, a *Certificate of Achievement* is issued to attendees that clearly demonstrate their understanding of the workshop material and choose to not take the optional exam.

For both on-site and online, there are no lectures or PowerPoint presentations. Instead, the instructor uses the following steps for each agenda module:



Certification Body-of-Knowledge

Fundamentals

- Statistical thinking
- Recurring statistical themes
- *The Great Numerical Quandary*
- Common statistical mistakes
- Process diagrams
- Data integrity & management
- Descriptive statistics
- Data visualizations
- The *Work-Evaluate-Decide* approach

Process baselines

- Power and sample size
- Process centering studies
- Production line comparisons
- Before-vs-after process studies
- The limitations of baseline studies

Measurement Systems Management (MSM)

- **Error-proofed MSM workflow**
- Lean methods for MSM
- MSM planning
- Stability studies and choosing the right intervals
- Bias and linearity studies
- Noise studies
- Special considerations for final inspection systems

- Special considerations for destructive testing
- Special considerations for attributes
- The limitations of MSM

Statistical Process Management (SPM)

- **Error-proofed SPM workflow**
- Lean methods for SPM
- SPM planning
- Process behavior chart selection
- IMR chart, pencil & paper
- Rational subgrouping
- XBar-R chart, pencil & paper
- Chart interpretation, *The Big Four*
- Chart interpretation, *The Other Four*
- Process Behavior Charts for OFAT
- Process Behavior Charts to find cause & effect
- Special considerations for short runs/frequent changeovers
- Special considerations for rare events
- Special considerations for attributes
- Time weighted process behavior charts
- Multivariate process behavior charts
- Process behavior charts for supplier management
- Turbo-charge your process behavior charts
- The limitations of SPM
- Process Capability Analysis (PCA)
- The limitations of PCA

Process Optimization

- **Error-proofed Process Optimization workflow**
- The Experimenter's Mindset
- Lean methods for Process Optimization
- Process Optimization terminology
- Process Optimization fundamentals
- Process Optimization planning and economics
- Simple, cost-centric experiments
- Design Diagnostics (JMP only)
- Process Optimization pre-requisites
- Process Optimization error-proofing steps, in detail
- Making smart business decisions

- Complex, detail-centric experiments
- Screening experiments (JMP and Minitab only)
- Process Optimization special situations
- Process Optimization economics, revisited
- The limitations of Process Optimization studies

Reliability Analysis (RA), optional, time permitting

- **Error-proofed RA workflow**
- Lean methods for RA
- RA planning
- RA terminology
- Common RA distributions
- Probability Distribution Functions
- Survival and Failure Curves
- Hazard Curves (JMP, Minitab only)

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