

Analytics Course - content

Module 1 – Introduction to Analytics

- What is Analytics and how is it useful?
- Relation to Machine Learning and AI
- Keys to successful analysis

Module 2 – Fundamental ideas and concepts

- Causality
- Randomness
- Dynamics
- Feedback
- Stability

Module 3 – Data, Tools and Visualization

- Data types
- Sampling
- Data properties
- Data quality
- Design of Experiments
- Data sources
- Analysis tools
- Plotting/Visualization

Module 4 - Statistics

- Descriptive statistics
 - Central tendency
 - Variability
 - Correlation
- Inferential statistics
 - Probability
 - Distributions
 - Hypothesis testing
 - Confidence intervals

Module 5 - Modeling

- Modeling principles
- Preprocessing
 - Data cleaning
 - Data transformation
 - Data reduction
 - Filtering
- Linear models
 - Least squares
 - Data splitting
 - Coefficient of determination
 - Residuals
 - Collinearity
 - Model order
 - Over-parametrization
 - Region of validity
 - Dynamic modeling

Module 6 – Data from controlled processes

- Fundamentals
- Interpreting data from control loops
- Patterns for common faults
- * Modify to include more root cause analysis and troubleshooting

Module 7 – Orientation in Machine Learning and AI