STA200:
Transfer Function Dynamics Identification

Duration:	**4 hours Online Only**
Audience:	**Process Control Engineers, Process Engineers, Research Engineers, Laboratory Personnel, Instrument Engineers and Supervisors.**
Prerequisites:	**None**
Course Material:	**Training slides and Pitops-TFI software product.**

Course Description and Objectives:

Identification of transfer functions using industrial process data is both an art and a science. Industrial data comprises of fast noise, drifts and disturbances; these result in special challenges while trying to accurately estimate the transfer function parameters. We use the most modern, advanced and sophisticated 3G dynamics identification technology (Geometric, Gradient and Gravity components) to isolate fast and slow disturbances to accurately determining the true transfer function. The technique used works remarkably well even for multivariable inputs using closed-loop data. Another unique feature is the successful transfer function identification with relatively short-duration data (where other techniques are commonly unsuccessful). The new method used in the course is far simpler and more powerful than other currently practiced methods. It can be easily learnt and applied by new personnel without advanced educational degrees or prior experience.

Learning Outcomes:

At the end of the course, attendees will be able to identify multivariable (multi-input) transfer function parameters using closed-loop data, open-loop data or a mixture of both. Attendees will learn skills to help isolate disturbances and identify the true transfer functions. The skills will be useful in all fields dealing with transfer functions – chemical, mechanical, electrical and industrial engineering, all branches of science (particularly chemistry), medical fields, population studies, statistics and related fields. The modern techniques are both revolutionary and novel; they produce successful results even with challenging data sets comprising of significant levels of complex, unknown and unmeasured disturbances. The following topics are covered in this course:

- Transfer function definition Fast and slow processes
- Different methods of characterizing process dynamics Characterizing high order transfer function models Step response coefficient models
- ARMA models
- Pros and cons of various dynamic models
- Open loop step tests, closed-loop tests, gradual changes in input
- 3G disturbance rejection technology- Geometric, Gradient and Gravity options Isolating noise from process data
- Dead time estimation tips
- Model prediction and correction procedures Industrial examples using real plant/process data
- Identification examples using many real and simulated conditions Zooming on the real transfer function in cases of multiple solutions Practical tips for successful closed-loop transfer function identification