

Thermo Scientific 21Plus! Process Optimization Training Course Outline

Course Objectives

This course is designed to provide the customer with a detailed understanding of the 21Plus! Process Optimization procedures. Upon completion of this course, customers can be confident in their ability to get the most out of the Thermo Scientific 21Plus! gauging system.

Course Content

- ◆ Measurements
- ◆ Product & Process Variation Analyses
- ◆ Machine Direction & Profile Controls
- ◆ System Calibrations
- ◆ Data and Log file Use
- ◆ Software Maintenance

Course Schedule

Training starts on Tuesday and runs through Thursday from 8:30 to approximately 4:30 with an hour for lunch (provided). Friday the instructor is available from 8:30 until 12:00 if the student desires additional training.

Prerequisites

All attendees of this course should have good knowledge of their process and have some familiarity with processing equipment, computer systems, and process controls. It is recommended, but not required, that each student attend and pass the 21Plus! Maintenance training course prior to enrolling in this course. Each student will be required to sign a secrecy agreement protecting product design details for both parties.

Evaluation

Each attendee will take an examination covering safety issues and common troubleshooting procedures. Results of the exam will be available for customer review. Upon successful completion of the course, the attendee will receive a Certificate of Completion.

Courseware

Each attendee will receive all necessary materials in software format to complete the course. Hardcopies of materials will no longer be provided unless specifically requested and paid for in advance.

All attendees will be required to have a laptop computer to facilitate the training.

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TOPIC BREAKDOWN:

Introduction

The course begins with a brief discussion of course objectives and schedules. Materials are distributed.

System Components and Architecture

The student will learn in detail about various measurement platforms, scanning platforms, computing platforms, and process interfaces. The student will be able to comprehend what constitutes a complete network based control system and how our products interconnect to provide a measurement and control system.

Measurements

Basic sensor measurements are covered in this section. Beta and FSIR measurement technologies will be covered. Calibration curve fitting and error determination are discussed. Where applicable, a section covering SICAL and same-spot measurement will be added to this discussion.

An explanation of the functionality of the Thermo Scientific Beta Sensor and/or Full Spectrum Infrared (FSIR) Sensor is provided. Calibration curve fitting and error determination are discussed. Where applicable, a section covering Thermo Scientific's SICAL, Same-Spot Measurement, SPC and FFT will be added to this discussion.

Product & Process Variation Analyses

The product and process variations present in continuous web processes are discussed. Sources of variation are identified, the 21Plus! features that ferret out these variations are presented, and plausible solutions are discussed. Each of the 21Plus! statistical calculations is presented for clarity.

Machine Direction & Profile Controls

A thorough review of both automatic profile and nominal controls is covered. We will discuss controls used in various customer processes. Common problems and expected performance levels are discussed. Particular attention is paid to tuning variables and long-term performance improvement.

System Calibrations

Product calibration discussion opens by reviewing Beer's Law, measurement statistics, and error determination. This is followed by the customer describing their off-line lab techniques. Alternative calibration techniques are also presented where high lab or sampling errors are present.

Software Maintenance

Software maintenance is a crucial component of 21Plus!. During this topic, we will discuss maintenance scheduling for calibration, software archiving, and preventative maintenance programs.

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Review of course

The attendee will be given an opportunity to ask and answer any questions or specific system issues. They will also be asked to complete a Course Critique for Quality Assurance, and will be given a brief quiz on the course materials.

Course Registration

Classes are held in our facility located in Wilmington Massachusetts, USA. Class sizes are limited, therefore reservations are on first come, first serve basis and must be made no less than two weeks before the scheduled class. For reservations contact our Customer Service Department at 1-800-366-2533 or FAX your request to (978) 667-4146, Attention: Training Administrator.

Course Cost

Cost is \$3,500.00 for first student, all other students billing on the same invoice and attending the same class at a \$500.00 discount. **Course cost does not include travel and living expenses.** If training is desired at customer sites then the cost would become \$10,000 for up to 6 customer personnel. **Again, this does not include travel and living expenses.**

Cancellations

There will be a cancellation fee of 20 % applied to all students canceling within three weeks of a class and a 50% fee for all students neither attending nor cancelling the class. Failure to attend for customers using contracted training slots will result in forfeiture of the contracted training slot.

Rescheduling

Thermo Fisher Scientific reserves the right to reschedule a class if there are less than three participants.