ADVANCED MODELLING AND CONTROL IN PROCESS DESIGN AND OPERATION

Sigale, Alpes-Maritimes, France

Venue: Dynamita Training facility, Sigale

Date: September 4-5

This course will have four main segments over the two days:
1. Basics of Sumo or refresher for active users
2. Engineering aspects of models, influent fractions, nutrient removal, chemistry, aeration, digestion, etc.
3. New features in Sumo18 (steady-state, scenarios, controllers, new models)
4. Advanced control modeling (AvN, ABAC, cascade, etc.)

All topics will include a short introduction and slides helping to explain the key engineering issues. Most of the time will be dedicated to hands-on simulations for interactive learning.

DAY 1

9.00 – 9.45 Introduction to modelling (Slides)
- Modelling fundamentals and key definitions
- Role and type of models
- ASM family
- Process simulation

9.45 – 10.45 Sumo refresher (Hands-on)
- General overview of Sumo as simulation environment
- What's new in Sumo18? (pre-release information)
  - High rate and sulfur models
  - Steady-state
  - Scenarios
  - Controllers with new interface

10.45 – 11.00 Coffee break

11.00 – 12.00 How to set up Sumo (Hands-on)
- How to use Sumo for steady-state and dynamic simulations
- Hands-on simulation: setting up a configuration

13.00 – 14.30 Influent fractions (Slides and hands-on)
- Wastewater constituents
- Wastewater and biomass fractions
- Role of different fractions in models
- Characterization protocols
- Fractionation example

14.45 – 17.00 Nitrification/denitrification/P removal/settling (Slides and hands-on simulations)
- Introduction to nitrification and denitrification
- Principle of biological phosphorus removal – new PAO/GAO model
- Biological kinetics
- Factors influencing nitrification/denitrification/bio-P
- Chemical P removal
- Aeration

DAY 2

9.00 – 10.45 Settling, digestion and side-stream treatment (Slides and hands-on)
- Settling – simplified and flux based
- Fermentation
- Anaerobic digestion and how to restart a pickled digester
- Centrate treatment

11.00 – 12.00 Biofilm technologies (Slides and hands-on)
- Biofilms – conceptualization
- MBBR, IFAS and Trickling filter configurations

13.00 – 14.30 Introduction to controllers (Slides and hands-on)
- Basics: Control and manipulated variables, (CV, MV), sensitivity
- Time based on-off, ratio, deadband and PID controller examples

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14.30 – 14.45 Coffee break

14.45 – 16.30 Advanced control (Slides and hands-on)
- Cascade controller example
- Use of SumoSlang Plantwide file for complex nitrogen control

16.30 – 17.00 Questions-Answers. Wrap-up of the two days