



## OMS-03 Principles and Applications of Linear / Non-linear programming in Refining Industry

## Training Courses

### INTRODUCTION

Advanced process control strategies invariably use linear and non-linear programming methods to solve complex and non-unique process models solutions. These techniques are employed in refinery planning, blend recipe formulations, optimum operating parameters for process units, etc.

The information imparted during the seminar will introduce the techniques of linear programming and affirm the shared knowledge by hand-on lab exercise. Attendees can bring information about their own refinery and blending operations to solve them using actual commercial system demonstrated in the course. The seminar will cover all technical, operational, modeling and economical aspects of planning, optimization of daily refinery operations.

### TRAINING OUTLINE

#### • Day-1 Introduction to Linear / Non-linear Programming

- Modelling of Physical Processes
- System of Equations- A treatise
- Introduction to Optimization - Graphical Methodology
- Linear programming Simplex Algorithm
- Revised and Dual Problem Simplex Algorithm
- Marginal values, Infeasibility
- Use of Sensitivity Analysis to handle infeasibility
- Integer Programming
- Non-linear Optimization
- Example-1 Diet Planning
- Example-2 Traveling Salesman routes
- Example-3 Crude Blending
- Example-4 Small Refinery products optimization
- Example-5 Crude Distillation Dual LP Problem
- Formulation of an Optimization problem
- Graphical Solution of LP problem
- Excel GRG2 based Solution
- Excel based VBA/Fortran LP Solution

#### • Day-2 Applications in the Fuels Blending

- Fuel Blending Operations in Refining
- Blending Problem Definition
- Linear Blend Models
- Non-linear Blend Models
- Methods to Handle Blend Non-linearity
- Fuels Specifications
- Control matrix of qualities
- Blending LP formulation
- Blend Optimization Methods
- How to handle Quality violations and giveaways
- Data Reconciliation and Feedback
- Levels of Blend optimization
- An example of Integrated Fuel Blending System
- Overview of Fuel Blending Economics
- Installation and Testing of Offline Blend Optimizer

#### • Day-3 Fuels Blending Optimization

- Blending Modeling Process
- Required Data
- Data Entry Screens
- Optimization and Discussion of output
- Single Product, Single Period Optimization
- Single Product, Multi-Periods Optimization
- Multi-products, Multi-Periods Optimization
- Discussion of Results

- Online versus Offline Optimizers
- Blending Status Survey Methodology
- Blending Project Implementation Strategy
- Why Blending Project Fail
- Demo of Commercial Blending Optimization Systems-I
- Demo of Commercial Blending Optimization Systems-II
- Discussion Forum
- Feedback and Certificate Awards

The training course covers about 45 topics of 40-45 minutes each and spans over three to five day's duration depending upon local working hours. The course is currently offered as a public / private course directly by OMS and in affiliation with various training institutes worldwide.

The lab exercises are extensively hand-on for real-life problems and three commercial software licensed for the training purposes are used to demonstrate and train the attendees in actual problem solving. It is, therefore, advisable for attendee to bring his/her laptop to gain maximum individual exposure to methodology shared in this course.

Attendees are encouraged to contact the course instructor via seminar hosting training institute sufficiently in advance of course date to get information about required data to use their specific refinery and blending operations in the lab exercises.

### COURSE INSTRUCTOR

Dr. Suresh S. Agrawal is founder and president of Offsite Management Systems LLC and has developed and installed innovative and technologically advanced automation software products, and integrated solutions for the automation of offsite operations of Chemical, Oil and Gas (COG) Industries. Dr. Agrawal has 25+ years of experience at senior positions with companies, including being Director of Refinery Offsite Operations at ABB Industrial Systems Inc., Houston, TX. He has also worked with reputable companies such as 3X Corporation, New Jersey and Exxon Corporation, New Jersey. Dr. Agrawal has successfully managed many advanced offsite refinery control projects in numerous countries. He has a doctorate degree (Ph.D.) in Chemical Engineering from the Illinois Institute of Technology, Chicago, and a Bachelor's Degree in Chemical Engineering from Indian Institute of Technology (I.I.T.), Mumbai, India. He has published more than 20 technical papers in the area of advanced control of refinery onsite / offsite operations.

#### 2017-2020 Course Schedule:

Dates	Venue
12-14 Sep, 2017	London, UK
11-13 Sep, 2018	Dubai, UAE
10-12 Sep, 2019	Houston, Texas
8-10 Sep, 2020	Singapore

**Registration:** [Click here](#) to visit the course page and then click on above Seminar dates to register and pay online. An email will be sent to you after successful registration.

#### For further information, please contact

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