18TH TO 20TH FEBRUARY 2025
INPROCESS OFFICE, BARCELONA

DYNAMIC PROCESS SIMULATION

First steps in the development of dynamic simulation models for process industries, starting from steady state solved cases.

INTRODUCTION

With current dynamic process simulators, it is possible to create a reliable representation of an operating plant on a PC - including all process equipment, all instrumentation and controllers and having it running several times faster than in real time. Dynamic Process Simulation provides flexible interaction between the engineer and the tool, making the user easily understand the consequences of his/her operational and/or design decisions - leading to better and quicker decision making and furthermore improved confidence in the decisions taken.

This course enables the attendees to use the dynamic modeling capabilities of dynamic process simulators to model and simulate typical processing facilities, showing the benefits dynamic process simulation can bring in the day-to-day engineering and operating environment.

COURSE OBJECTIVES

The course content covers the basic needs of dynamics process simulation users. The attendees will learn the fundamentals of dynamic process modeling using commercial dynamic simulators and the main differences between steady state and dynamic modeling will be introduced. Also, the necessary basic control theory will be reviewed briefly. To facilitate a more efficient and interesting learning experience, all concepts will be studied based on many simple & practical hands-on examples. The basic unit operations are introduced in a stepwise manner with the objective of being able to build dynamic process flowsheets by the end of the course. The use of several software functionalities will show users how to explore operating alternatives for the processing plant units that are being studied. Theory is used to introduce the objectives of every module in the course as well as to help attendees to understand how the underlying calculations are performed.

COURSE AUDIENCE

This course is aimed at engineers who are involved in the design, control and operation of any processing facility. The workshops have been designed with an increasing complexity, in order to help in developing the attendees' learning curve. Although the workshop examples are taken from the Gas Processing industries, the acquired foundations on dynamic simulation can be applied to any process industry. Therefore, the course content is also applicable for process engineers, control engineers, safety, and environmental engineers in other industries, where dynamic process simulation is in use.

Important Note: Participants must be familiar with steady state process simulation to fully benefit from the subjects covered in this course.

INSTRUCTORS

The training course will be lectured in English language by experienced **inprocess** instructors - who accumulate several years of experience in the use of process simulation both at industry and research/university level.

MODULES CONTENT

MODULE	MODULE TITLE AND SHORT DESCRIPTION	TIME	DAY
1	BASIC CONCEPTS OF DYNAMIC SIMULATION Understanding the foundations of dynamic simulation using Process Simulators: The Pressure-Flow solver; Distributed and Lumped models; Pressure nodes and flow resistances.	2 hours	Day 1
2	DIFFERENCES BETWEEN STEADY-STATE AND DYNAMIC MODELS Discussion of the main differences between the two modelling modes with regards to specifying equipment and flowsheet details. Rules for transitioning from a solved steady-state model to a dynamics one.	1 hour	
3	FUNDAMENTALS OF PROCESS CONTROL Open and closed loop. PID controllers and final control elements. Setup and modification of control strategies.	2 hours	
4	DYNAMIC MODEL OF AN INLET SEPARATION PLANT Development of an initial plant model in Steady State. Transition to Dynamics using equipment sizes, control valves, control loops, strip chart graphs, etc.	3 hours	
5	ENHANCED DYNAMIC SIMULATION Enhancement of previous model by incorporating additional details. Some of the defaulted values are modified and parts of the assumptions are revisited.	3 hours	Day 2
6	GAS COMPRESSION SIMULATION IN DYNAMICS Compressor maps, anti-surge control, bypass valves and other protection equipment is incorporated into the original model.	3 hours	
7	OPERATIONAL PERFORMANCE (SCHEDULING OF EVENTS) The Event Scheduler is a powerful tool that allows the dynamic modeller to plan and program i.e. several operational performance tests to monitor the response of the model in front of upsets and perturbations.	2 hours	
8	UNIT TRIPS AND COMPRESSOR PRESSURE RELIEF The robust dynamic model will be perturbed and upset by programming with the Event Scheduler unit trips and unexpected problems. The response of the protection equipment will be monitored.	2 hours	Day 3
9	MODELLING A NGL EXTRACTION PLANT Preparation of a new dynamic model of a NGL Extraction Plant. Transition from Steady State to Dynamics. Setup of level, flow and pressure PI control loops. On-off and cascade controllers are also introduced.	2 hours	
10	DYNAMIC SIMULATION OF A DISTILLATION COLUMN Expansion of the previous case by setting up a Stabilization column. A control strategy will be developed to meet the TVP specification for the NGL product	3 hours	
11	BASIC CONTROL OF DISTILLATION COLUMNS In this module, a fractionator is added to the model and a basic control scheme for level, temperature, pressure and composition is developed and discussed.	3 hours	Option
12	COLUMN PRESSURE RELIEF The standard condenser unit of the fractionator is replaced by an expanded overhead system constituted by a cooler, a separator and a pump. The system is developed in dynamics mode. Finally, a pressure relief system is configured	2 hours	Option

HOW TO REGISTER

To book your place at the course please, send us an email to: **training@inprocessgroup.com** detailing:

- Course name and dates
- Attendee name
- Company/Department/Position
- Phone number
- email
- Short (less than 50 words) background description
- Need for proforma invoice?
- Attach the completed Appendix A that you will find at the end of this brochure

After receipt of the registration request, places will be reserved for 10 days. After payment of the course fee, the registration is firmly confirmed. In case you are facing issues to travel, a remote attendance through TEAMS or Webex meeting can be also explored under request. Indicate the same in your registration.

For an optimal learning experience, the number of available places is limited to 10 attendees. Please, register as soon as possible in order to ensure your participation.

COURSE VENUE

The course will be given from Inprocess' headquarters office:

Carrer Pedro i Pons 9-11, 13th floor
E-08034 Barcelona.

Our office is located 50m from the Av. Diagonal, near María Cristina metro station, directly connected to the city centre and main railway stations.

Depending on the number of attendees the location of the course might change to a place nearby. Inprocess will inform the attendees with enough anticipation.

COURSE PRICE

This 3-days course is priced **€ 1,900**. All prices and rates quoted in this document are exclusive of taxes and duties.

PAYMENT

All bank transfers in Euros to:

Deutsche Bank

CCC: **0019 0020 9240 1029 4972**

IBAN: **ES17 0019 0020 92 4010294972**

SWIFT: **DEUTESBBXXX**

Send us an email with a copy of the bank transfer to inform us about the payment (**training@inprocessgroup.com**)

Appendix A: Workflow for Order

Please fill in and sign the information below: **Order** (page 5) and email or fax to us at least 1 month before start of the training.

Please provide complete and clearly printed contact and billing details:

	Contact Information	**Billing Information**
		o same as contact information
Name :		
Title / Department :		
Company :		
Complete Address :		
Telephone Number :		
Fax Number :		
Email Address :		
VAT # :		
Signature :		

Purchase order (number / date):

O is enclosed O will follow by mail

O my company does not require a purchase order