13TH TO 17TH JUNE 2022

VIRTUAL CLASSROOM

inprocess

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.

COURSE CHARACTERISTICS

Inprocess' Virtual Classroom courses bring together the benefits of Inprocess' training philosophy (learn by doing) and the capabilities of online-style training. The full-time presence of the instructor during the five days of the course allows the attendees to gain a complete insight into the course concepts and simulation features, while at the same time letting them interact in a relaxed, informal way with the course instructor. With the course contents distributed over the course of a week, in an easy-to-follow format, the project experience of Inprocess' simulation expert will facilitate the learning process of the course attendees.

Highlights of Inprocess' Virtual Classroom Courses:

- **Flexibility**: **Class sessions are scheduled in half-days, for a whole 5-day week**, for two reasons: firstly, to avoid an excessive and mentally-exhausting concentration on training for a full day. Experience shows that the attention of the students in the last hours of the day diminishes, making this time less productive in terms of training. Secondly, because this allows students to devote part of their time to the other tasks of their daily work. As with physical classroom courses, in-house Virtual Classroom courses' content and length can be tailored to any specific company requirements.
- **Mentorship**: For the rest of the day, when lessons are not being given, the instructor will be available to solve any doubts that the students might have and will address all questions posed by the students the following day, clarifying anything that might have remained unclear and making sure that all the main targets of the module have been achieved. This ensures that no student is left behind during their learning path.
- **Topic focus and Experience**: Inprocess' experts, with several years of experience in using process simulation to solve engineering or operational issues, will be giving the simulation lessons, focusing in each of them on the questions that are most relevant to their daily practice (e.g. distillation, rotating equipment, heat transfer, etc.). It is worth mentioning that Inprocess is a company dedicated to helping clients in using process simulation to achieve their business objectives. Therefore, the know-how of our engineers is based on an extensive problem-solving background and not only on expertise in software functionalities and user interfaces.
- **Learning assessment**: Final tests, with questions regarding the concepts addressed during the course, are available on request. This is a useful tool for companies in order to be able to track the increase in knowledge of the attendees and to keep track of their learning curve

Virtual Classroom Training Characteristics

- **Documentation** of the course sent by email and readily available for each student in the class.
- **Easy access** to the Virtual Classroom through web browser or by downloading the WebEx app in the desktop. Invitations will be sent to each attendee after enrolment on the training course is confirmed.
- **2-way screen sharing** in real time (instructor – student; student – instructor). This facilitates solutions to any doubts or questions and makes every attendee feel part of the training experience through all the questions or issues posed.
- **Chat available** to interact with the instructor and the rest of attendees in real time. This allows Inprocess to keep a record of the questions and issues raised, ensuring that no one is "left behind" while progressing in the training.
- **Full presentation control:** Drawings, comments, arrows, highlighting and many more tools are used by the instructor to focus on the different concepts explained and demonstrated during the course. These annotations can be saved as snapshots that can be made accessible to the attendees. This ensures that the most important tips, the answers to specific questions, and everything outside the scope of the training material is kept on record for the students.
- **Student station remote control**. The online connection allows the instructor (under request) to take control of the student's workstation. This will facilitate both the troubleshooting of individual cases and specific problem solving.

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.	2 hours	
3	FUNDAMENTALS OF PROCESS CONTROL Open and closed loop. PID controllers and final control elements. Setup and modification of control strategies.	2 hours	Day 2
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.	2 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.	2 hours	Day 3
6	GAS COMPRESSION SIMULATION IN DYNAMICS Compressor maps, anti-surge control, bypass valves and other protection equipment is incorporated into the original model.	2 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	Day 4
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	
9	MODELLING AN 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	Day 5
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	2 hours	

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.

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 online from Inprocess' headquarters office:

To connect to the training, once the enrolment to the training is confirmed, the attendee will receive through email an invitation to the meeting with the access code and password. The attendee shall log in to the meeting with its personal email and with its full name as user.

Cisco WebEx software can be downloaded for free from its website (https://www.webex.com/downloads.html/) or directly by connecting to the meeting using the browser (user will be guided the first time through a easy to follow process to log in to the meeting without the need of the installation of the software). Other software such as MS Teams is also suitable for remote connection.

COURSE PRICE

This 5-days course is priced **€ 1,650**. 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 6) 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