PDC Process Design Center

Keuken & de Koning B.V.
process engineers and consultants

Conceptual Process Design Course & PROSYN® workshop

November 21st/22nd, 2017 – Breda (NL)

Inspired by the successful and well-attended Conceptual Process Design (CPD) course of last year, we combine this year's CPD course with a PROSYN® workshop. In this workshop you can experience the power of structured CPD methods using an example or practical case of your own choice.

Aim of the course and workshop

In Conceptual Process Design (CPD) a first design of a petrochemical or biochemical plant is made based on preliminary research data and ideas. The outcome is the selection and combination of process steps, which determines the overall technical and economic feasibility. Generally, CPD efforts are relatively small, but the impact on the final plant design and costs are significant. When structured conceptual process design is successfully applied at an early R&D stage, cost and energy savings of 20 to 50% can be realized and development time can be shortened considerably.

The **Conceptual Process Design Course** introduces structured methodologies for CPD and covers the essential elements needed to develop a first process design. At the end of the course participants will be familiar with these aspects, which include the development of a flowsheet, selection and design of reaction- and separation technologies, equipment and process intensification, and generation of an equipment factored (class 4) cost estimate. The course includes several examples of practical cases from the (bio-)chemical industry.

The **PROSYN® workshop** does not only allow you to familiarize yourself with artificial intelligence tools for conceptual design, but also enables you to work on a design problem of your own choice. The conceptual design case may be taken from your daily practice, but it is also possible to run specific examples which are available at the workshop.

Target audience

The course is intended for professionals working in an R&D or chemical engineering environment in the industry, RTOs and academia. The participants should have a basic understanding of chemical engineering.

Location

This course will be held at the office building of **PDC/Keuken & de Koning**, Catharinastraat 21f, 4811 XD Breda, The Netherlands. The building is nicely located in the historic city center of Breda next to the central park. From Schiphol Airport it takes 50 minutes by high-speed train (Intercity Direct) to reach Breda central station, which is at walking distance from the course location.

Programme

The course is structured as a two-day event, which is scheduled from Tuesday, November 21st, 9:00 (CET) until Wednesday, November 22nd, 14:30 (CET).

DAY 1 – November 21st, 2017

9:00 – 17:30 Conceptual Design Course

- **Introduction**
  - Importance and benefits
  - Real-life examples from CPD projects
- **Structured methods**
  - Design principles and approaches used in CPD
  - Alternative methods (decomposition, branch and bound, evolutionary, hierarchical, superstructure optimization, heuristic-numeric) are introduced and compared
- **Basic data and physical properties**
  - Introduction to physical properties, phase equilibria, and physical property models
  - Implications of non-ideal behavior in process design
  - Data sources, data validation, and regression
  - Examples of non-ideal mixtures and model artefacts
- **Process economics**
  - Classification of cost estimates
  - Equipment cost correlations and installation factors
  - CAPEX and OPEX estimation
- **Reactor design and selection**
  - Reaction equilibria and reaction kinetics
  - Using reactor design to control reactions: Reactant addition, product removal, backmixing characteristics, temperature, pressure, contacting of phases, catalyst structure, etc.
  - Technical reactor concepts
  - Design of reactors as part of a process
- **Separation technologies**
  - Phase separation by distillation (simple, azeotropic, extractive) or crystallization
  - Affinity separation (extraction, absorption, adsorption, chromatography, SMB)
  - Membrane separation
  - Separations and recycles
- **Equipment and process intensification**
  - Equipment intensification of separators, reactors, heat exchangers and other equipment
  - Reactive separations with a focus on reactive distillation. Example on production of methyl-acetate using reactive distillation
- **Heat integration in conceptual design**
  - Introduction to Pinch analysis
  - Exploiting pressure effects and using superheated steam dryers, multi-effect evaporators, and mechanical vapor recompression to reduce energy use

19:00 Course Dinner

A course dinner is organized in the historic city center of Breda. The inspiring environment is a perfect place for an informal dinner with the other course participants and conceptual design experts.

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DAY 2 – November 22nd, 2017

9:00 – 14:30 PROSYN® workshop

In the workshop you are invited to bring the course knowledge into practice by operating PROSYN® yourself on a case or example of your interest. If you select your own case, we recommend limiting it to a specific conceptual design problem in view of the available time. For example you may wish to investigate the reactor selection and design for specific chemistry or investigate a separation problem. To ensure the highest effectiveness, we recommend informing us in advance of the case you would like to investigate with PROSYN®.

Course and workshop fee

The fee for the course and workshop is **€ 1500 per participant (excl. VAT)**. Course material, coffee/tea, lunch, and a dinner on Tuesday evening are included in the fee.

Practical

The language used during the course and workshop is English. For the workshop, participants are requested to bring a computer or laptop which allows internet access. This is needed to connect to the PROSYN® server. In case of doubts, please contact us to check the system requirements.

Upon request, we can book accommodation at Hotel Golden Tulip Keyser Breda or Hotel Nassau Breda. Both hotels are located at a convenient walking distance from the course location. A reduced rate applies for the course participants, which is not included in the fee.



Course instructors

Dr. Hank Vleeming joined PDC/Keuken & de Koning in 1999 where he has the position of Chief Technology Officer (CTO). He holds a Master Degree in Chemistry from Leiden State University (1992) and a PhD degree in chemical engineering from the Eindhoven University of Technology (1997). His expertise is in conceptual process design using expert systems. He gained broad technology and industrial experience working with clients and partners in Europe, Asia and North & South America.

Dr. ir. Raf Roelant has over five years' experience as Chemical Engineer and Consultant at PDC/Keuken & de Koning. He holds a Master and PhD Degree in Chemical Engineering from Ghent University. He has worked mainly on processes converting biomass to chemicals and fuels through catalytic reactions and fermentation. His specialty is reaction engineering.

Registration and cancellation

Registration for the course proceeds by sending an email **before November 3rd, 2017** citing 'Conceptual Process Design Course and Workshop 2017', and including your name, email address, phone number, company/organization, invoice address and VAT number. After registration you will receive a confirmation, an invoice, route description, and further information related to parking and hotels nearby.

The number of participants is limited to 15 so early registration is recommended. Cancellation with a full refund is possible up to 2 weeks before the start of the course. After this date restitution of the course fee is no longer possible. Substitutions are possible at all times.

PDC/Keuken & de Koning reserves the right to cancel the course and workshop if minimum enrollment is not met, or if conditions beyond the company's control prevail. In the event of cancellation, you will be notified at least 10 working days prior to the course start date.

Contact information

For further information and enrollment, please contact:

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