

These courses, run annually since 2018, are presented by Dennis Forte & Associates in conjunction with the University of Applied Sciences & Arts Western Switzerland Valais (HES-SO Valais). D. Forte & Assoc. has been presenting extrusion training in countries including Australia, Thailand, Norway, Chile & New Zealand for over twenty years.

Food Extrusion Technology

HES-SO, SWITZERLAND — 7-9 FEBRUARY 2022

Overview

This 3-day course covers the principles of extrusion, the design of extrusion processes, and the formulation of extruded human food products. Principles learned will be demonstrated using the extruder in the Hes-So Valais.

The program provides background in general extrusion technology, but is specifically directed at extrusion of human foods, including the use of this technology for manufacture of products such as breakfast cereals, snacks, TVP, pasta etc.

The course applies to both single and twin screw extrusion technology, and covers topics from the basics of extruders and their configuration, through what is happening chemically and physically inside the extruder barrel, to an

understanding of extruder dies and extruder instability.

Course Content

Topics covered include -

- › Principles of Extruder Configurations (single and twin screw)
- › Role of Rheology in Extrusion
- › Die Types and Effects - Die Design
- › Extrusion Ingredients - Design of Formulations for Extrusion
- › Preconditioning for Extrusion
- › Product Density Control
- › Causes and Effects of Extruder Instability

- › Extrusion Troubleshooting
- › Screw, Barrel and Die-plate Wear

Principles learned will be applied during the practical demonstration on day 2. Important aspects of peripheral systems (eg raw materials pre-processing, preconditioning, product drying) are also covered.



Extrusion Scale-Up & Process Transfer

HES-SO, SWITZERLAND — 10-11 FEBRUARY 2022

Overview

This course builds on information presented in our three-day extrusion courses. It covers techniques to scale-up an extrusion process - eg from pilot scale to production scale - or to transfer a process from one type of extruder to another. The extruders may be either the same or different makes of extruder.

Following a brief review of extrusion theory, the program discusses methods to quantify both material rheology and the extrusion process. This is then used as a basis for a planned approach to scale-up and/or process transfer. Analysis and scale-up of extrusion dies are covered as separate topics. Worked examples - taken from actual industrial scale-up experience - are used to demonstrate the methods.

The aim is to provide participants with a science-based approach to scale-up and process transfer, but which applies to real industrial processes. The limitations inherent in scaling the process is also discussed, along with how small-scale trials should be planned so that processes are more scalable.

Course Content

Topics covered include -

- A Review of Extrusion Processing Theory
 - › The Four Golden Rules
- Development of Optimal Extruder Profiles
- An Introduction to Dimensional Analysis
- Quantification of Material Rheology
 - › Ingredients and the Finished Product
- Quantification of the Extrusion Process
 - › The Mass & Energy Balance
 - › Material Rheology
 - › Weighted Average Total Strain (WATS)
- Scale-up & Process Transfer
- Modeling the Degree of Cook in Extruders
- Use of Dimensional Analysis
 - › The Operational Characteristics of Extruders

- › Design and Evaluation of Extrusion Dies
- › Modelling of the Direct Expansion Process
- › Modelling of a Sheeting Die

Case Studies

- › Twin Screw Scale-up - Crispbread
- › Single Screw Scale-up - Pasta

Course Note

This is an advanced program, and considerable prior knowledge of participants is assumed - we recommend that participants should have previously attended one of our three-day extrusion courses as essential background to this more advanced program. Participants should also expect significant mathematics in the methods presented for scale-up and process transfer.

Sponsor

Day 1 of this course is sponsored by CFAM.



Food Extrusion Technology Extrusion Scale-Up & Process Transfer

HES-SO, SWITZERLAND — FEBRUARY 2022

Course Venue

HES-SO Valais Wallis
Institute of Life Technologies
Campus Energypolis
Rue de l'Industrie 19
CH - 1950 Sion
Switzerland

Registration Fees

Food Extrusion Technology
€1350 per person (approx. CHF2077, GBP1142)

Extrusion Scale-up & Process Transfer
€975 per person (approx. CHF1035, GBP825)

Registration fees are set in Euro and will vary when converted to other currencies according to fluctuations in exchange rates.

A **10% discount** applies for registrations received by **17 December 2021**.

An **additional 10% discount** applies for those attending both courses.

An **additional 5% discount** applies for 3 or more course registrations received together from the same company.

Discounted fees apply for PhD students and non-profit research organisations - see course webpages for details.

Registration fee includes handout notes directly related to the presentations, as well as lunches, morning & afternoon refreshments.

REGISTRATIONS CLOSE 21 JANUARY 2022

It is planned for the course to be presented on-site. If Covid-19 restrictions prevent this then the course will revert to live streaming.

Register online via course webpages, or send participant details (name, company, address, email, ph) to training@fie.com.au

Course Enquiries

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D. Forte & Assoc. is a private R&D company offering a complete range of technical consulting services to the processing industry, including a range of specialist training courses. Due to its unique business structure, D. Forte & Assoc. is able to deliver innovative, flexible solutions to the needs of processors.

Details of services offered by D. Forte & Assoc. are available through their website at dennisforte.com.au

The Institute of Life Technologies at the University of Applied Sciences and Arts Western Switzerland Valais (HES-SO Valais) offers applied research & development. Projects are carried out by research groups of principal investigators and senior research associates. The combination of complementary scientific skills and industry experience generates unique synergies and new possibilities. HES-SO Valais has extensive pilot plant facilities including a twin-screw extruder.

HES-SO Contact Michael.Beyrer@hevs.ch

Course Presenter

Mr Dennis Forte, a chemical engineer with extensive experience in extrusion processing and die design, including breakfast cereals, extruded snacks, pasta, and confectionery. Dennis has worked with a wide variety of companies using extrusion technology.

Books by the Course Presenter

Available to course participants at 20% discount to list price. Or order online from fie.com.au/books or major booksellers.

