



FOOD EXTRUSION TECHNOLOGY

Sion, Switzerland, 4 to 6 February 2018

EXTRUSION SCALE-UP & PROCESS TRANSFER

Sion, Switzerland, 7 & 8 February 2018

VENUE INFORMATION

Course offered in conjunction with [University of Applied Sciences and Arts Western Switzerland Valais \(HES-SO Valais\), Institute of Life Technologies.](#)

Course venue is at:

Institute of Life Technologies
School of Engineering
Route du Rawyl 64
1950 Sion 2
Switzerland
(Building F / Room 101)

A copy of the planned program is attached.

Note visitor parking is limited at the University. We strongly advise to use public transport.

What to bring:

- Printed notes will be provided, but you may want your own pen and notepaper
- A calculator may be useful to follow examples/tutorials
- We will be visiting the pilot plant – covered shoes are required on that day (Tues 6 February), and you may like to bring a lab coat to protect your normal clothes.

Contact at the venue:

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Office FR05
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Getting to Sion:

A direct train service (no changes) runs from Geneva Airport station to Sion – approx. 2 hrs (running generally twice per hour during the day). Swiss railways information, including timetables and tickets, is available via www.sbb.ch (English version via <https://www.sbb.ch/en/home.html>) – but advance bookings are not necessary.

In Sion:

For travel to the University direct from the Station, take bus nr 353, destination "Crans Montana" til the stop "Brasserie".

Maps (in English, and in Français/Deutsch) are following.

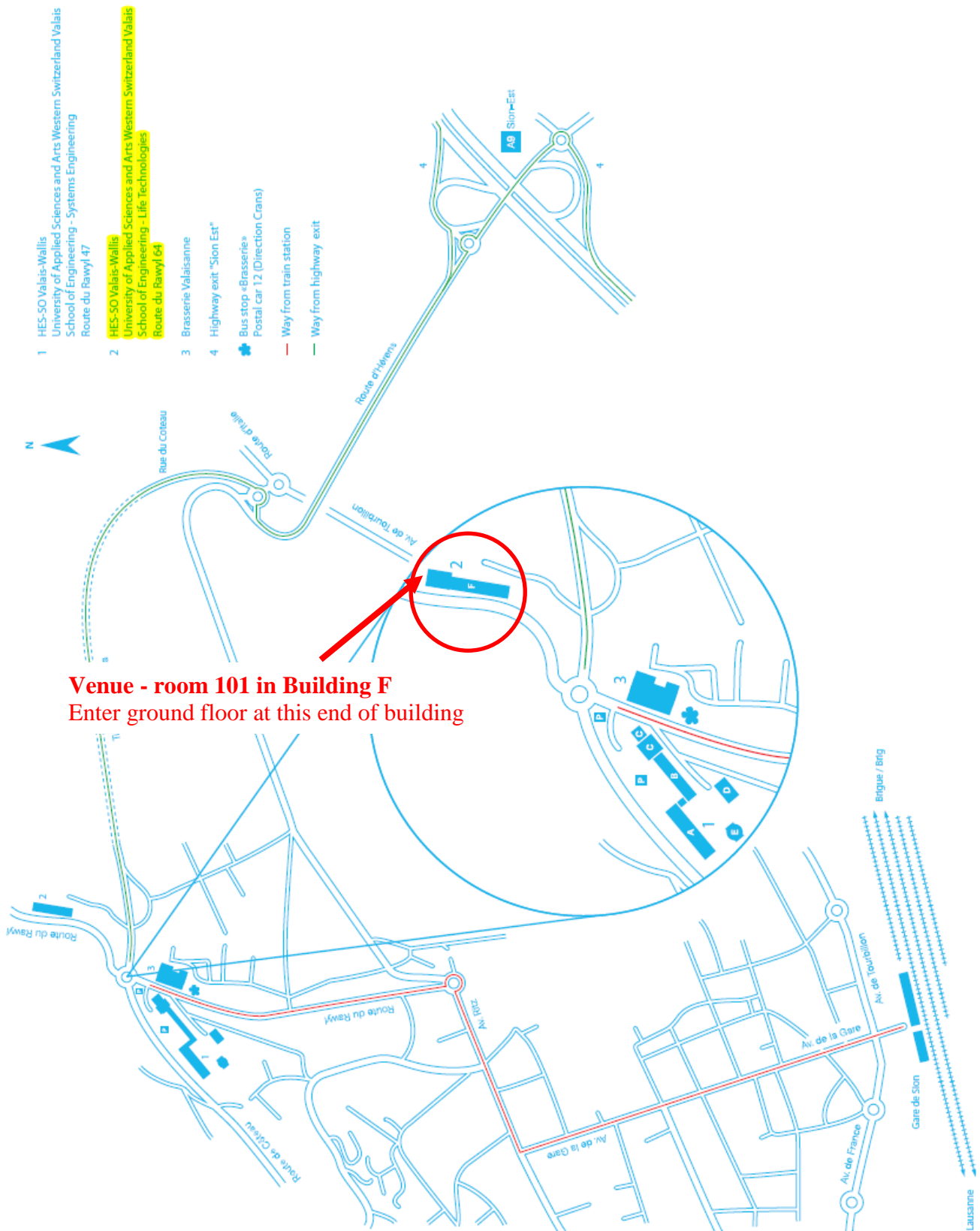
The course will be held in Building F / Room 101.

Details regarding travel to HES-SO (and links to download copies of the maps) are available from <http://www.hevs.ch/en/rad-institutes/institute-of-life-technologies/contact/institute-of-life-technologies-1496>

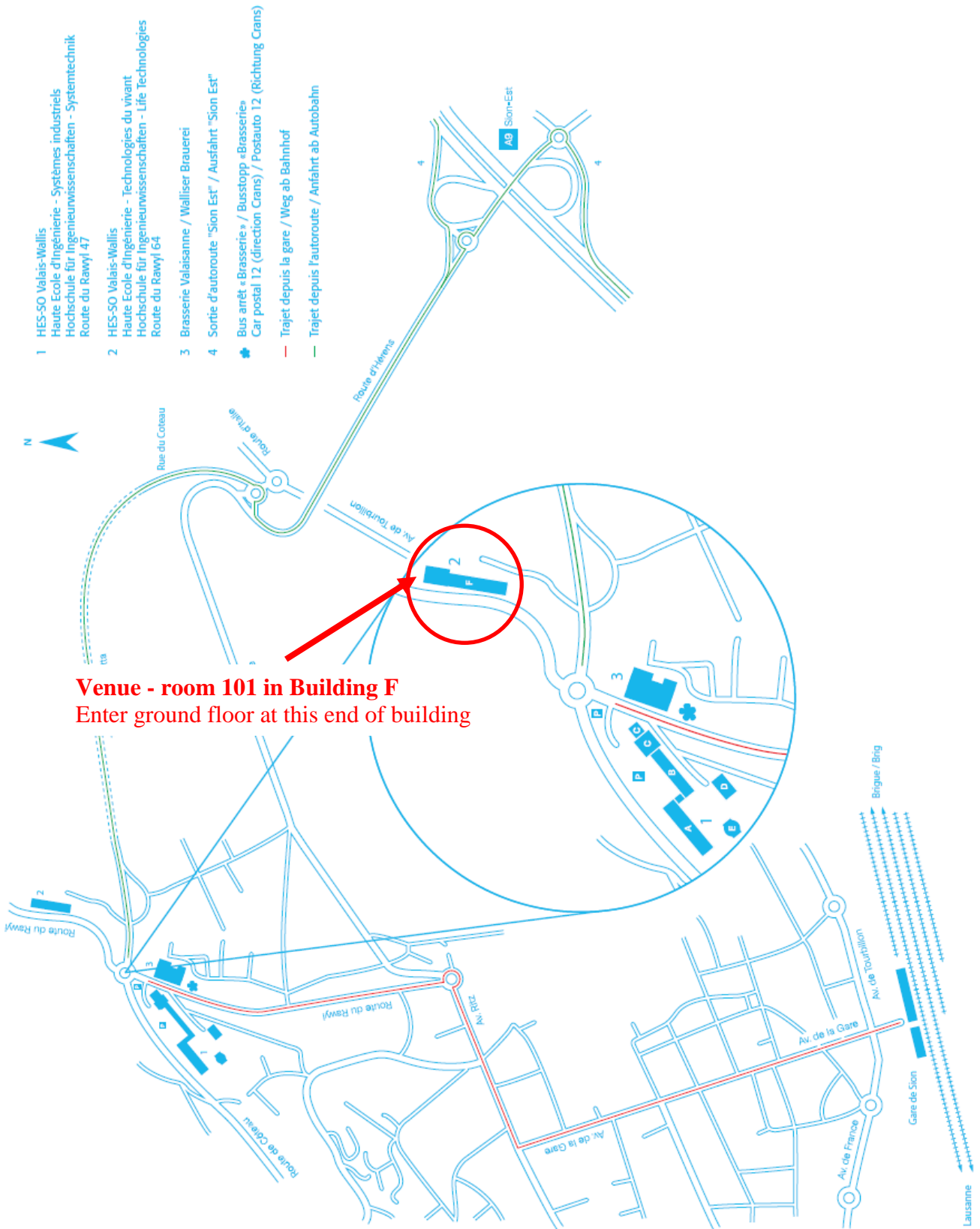
Course Dinner:

Details are yet to be finalised, but we are planning an optional course dinner on the evening of Tuesday 5 February, with traditional food of the region. Cost expected to be in the vicinity of CHF60 per person. We will require confirmation of those wishing to attend during the first day of the course.

Map in English



Plan (F+D)



Short Course on

FOOD EXTRUSION TECHNOLOGY

Sion, Switzerland, 4 to 6 February 2019

PLANNED PROGRAM

Note: The following program may be subject to minor change

Day 1 **Monday, 4 February** Sponsored by  Baker Perkins

8:15	Registration
8:30	Introduction and welcome, Overview of the extrusion process (Gordon Young)
9:00	Extruder configurations (single and twin screw) (Dennis Forte)
10:00	Morning Break
10:15	Basic science of extrusion (Gordon Young)
11:00	Role of rheology in extrusion processing
	Screw & Die Characteristics in Extrusion Processing (Dennis Forte)
12:00	Lunch
13:00	Address by Baker Perkins – Day sponsor
13:15	Principles of die design (Dennis Forte)
14:15	Ingredients and their effects (Gordon Young)
15:00	Afternoon Break
15:15	Product formulation exercise (Gordon Young)
16:00	Preconditioning for extrusion (Gordon Young)
16:45	Close Day 1

Day 2 Tuesday, 5 February Sponsored by Extrusion Expertise Excellence

- 8:30** Texturisation during extrusion processing (Dennis Forte)
- 9:15** Causes and effects of instabilities during extrusion processing (Dennis Forte)
- 10:00** **Morning Break**
- 10:30** Screw, barrel, and die-plate wear (Dennis Forte)
- 11:15** Single screw extruders vs twin screw extruders (Dennis Forte)
- 12:00** **Lunch**
- 13:00** Address by Day sponsor
- 13:15** Demonstration in HES-SO Pilot Plant
- 15:00** **Afternoon Break, Discuss plant observations**
- 15:30** Optimal Extruder Screw Profiles (Dennis Forte)
- 16:15** **Close Day 2**

Day 3 Wednesday, 6 February Sponsored by

- 8:30** Extrusion Technology Workshop (Dennis Forte)
- 9:15** Paste Viscosity Measurement and Extruded Product Quality (Gordon Young)
- 10:00** **Morning Break**
- 10:30** Scale-up and process transfer (Dennis Forte)
- 11:15** Drying technology related to extruded products (Gordon Young)
- 12:00** **Lunch**
- 13:00** Address by Buhler – Day sponsor
- 13:15** Understanding Co-Extrusion Technology (Dennis Forte)
- 14:00** Extrusion trouble shooting (Gordon Young)
- 14:45** **Afternoon Break**
- 15:15** Extruded product quality assurance and how to achieve it (Dennis Forte)
- 16:00** Final discussion, Close of course

Short Course on

EXTRUSION SCALE-UP & PROCESS TRANSFER

Sion, Switzerland, 7 & 8 February 2019

PLANNED PROGRAM

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Day 1 Thursday, 7 February - Basic Principles

8:15	Registration
8:30	A Review of Extrusion Processing Theory – <i>The Four Golden Rules</i>
9:30	Development of Optimal Extruder Profiles
10:15	Morning Break
10:45	An Introduction to Dimensional Analysis
11:45	Modelling the Degree of Cook in Extruders
12:30	Lunch
13:15	Quantification of the Extrusion Process – <i>The Mass & Energy Balance</i>
13:45	Quantification of the Extrusion Process – <i>Material Rheology</i>
14:30	Quantification of the Extrusion Process – <i>Weighted Average Total Strain (WATS)</i>
15:30	Afternoon Break
16:00	Scale-up & Process Transfer – <i>Part 1</i>
16:45	General Discussion
17:00	Close Day 1

Day 2 Friday, 8 February - Application of the Principles

8:30	Review of Day 1
9:00	Scale-up & Process Transfer – <i>Part 2</i>
9:45	Use of Dimensional Analysis – <i>The Operational Characteristics of Extruders</i>
10:30	Morning Break
11:00	Use of Dimensional Analysis – <i>Design and Evaluation of Extrusion Dies</i>
11:45	Use of Dimensional Analysis - <i>Modelling of the Direct Expansion Process</i>
12:30	Lunch
13:15	Use of Dimensional Analysis - <i>Modelling of a Sheeting Die</i>
14:00	Case Study: Scale-Up of Single Screw Extruders – <i>Pasta Extrusion</i>
14:45	Afternoon Break
15:15	Case Study: Scale-up of a Crispbread Extrusion Process
16:15	General Discussion
16:45	Close of Course