



Course organisation

ENG 431 - Safety of chemical Processes

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Swiss, married, 2 daughters

Main expertise: Risk analysis, Thermal Process Safety (reactive hazards), Design Pressure Relief Systems



IOWA STATE
UNIVERSITY

DTU Technical University
of Denmark

EPFL
ÉCOLE POLYTECHNIQUE
FÉDÉRALE DE LAUSANNE

ETH zürich

CODEXIS®

swissi
TUVSUD
Process Safety

DSM
BRIGHT SCIENCE. BRIGHTER LIVING.

TUVSUD
Process Safety

2002

2002 - 2005

2006 – 2007

2007 – 2014

2014 – 2015

2015 – now

Chemical engineer

PhD Biotechnology

Analytical Biochemist

Process Safety Consultant

Process Safety Specialist

Process Safety Consultant

TÜV SÜD at a glance



15,000+

technical
experts



150+

years of safety,
security & sustainability



1,000+

locations
worldwide



26,000+

TÜV SÜD
employees



€2.9

billion in
annual revenue

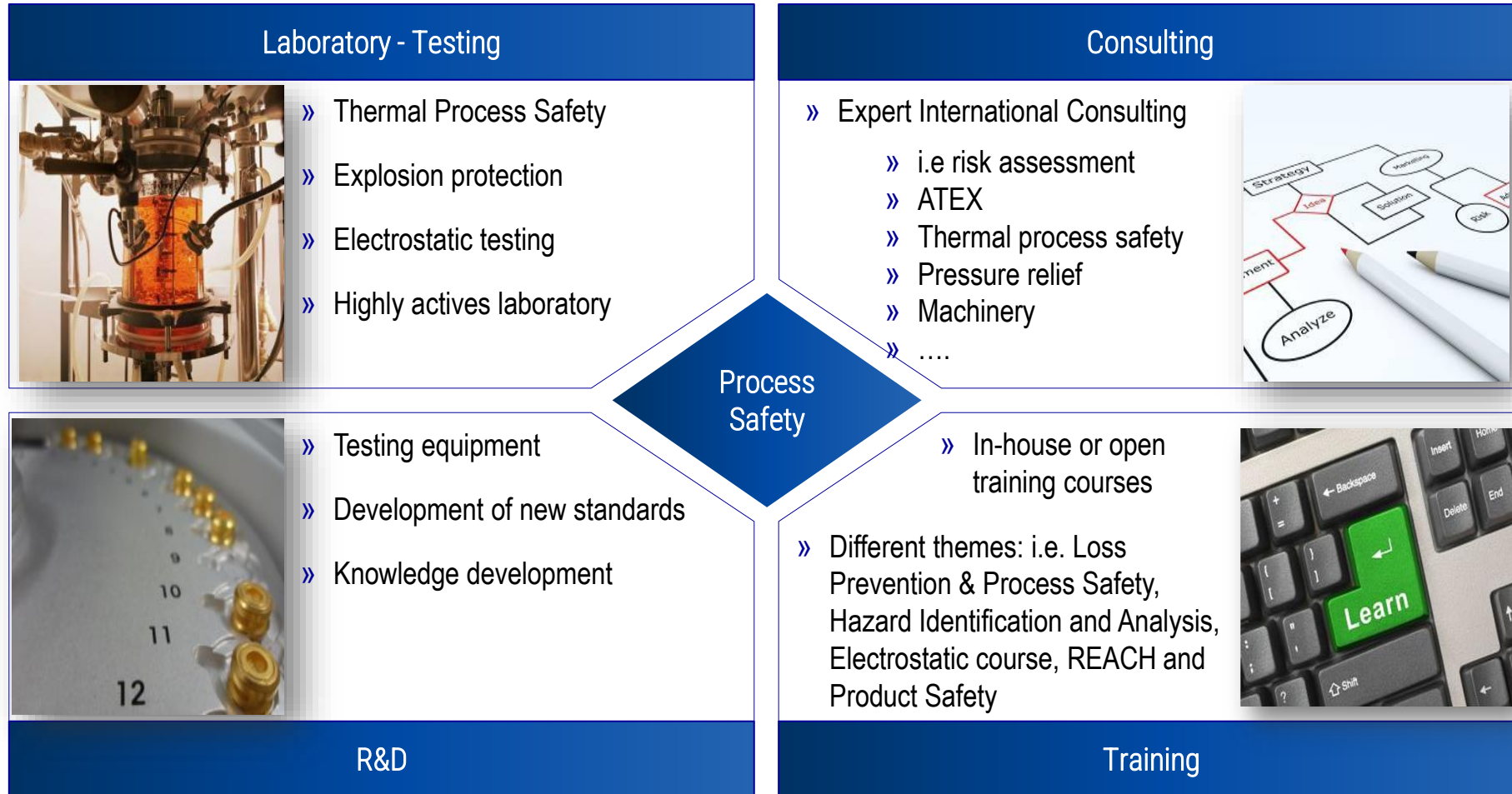


100 %

independent
& impartial

TÜV SÜD global experts are committed to helping you manage risks and access global markets through a comprehensive portfolio of technical solutions

Reliable services in all fields of Process Safety



Type of training

- On site lecture
- Moodle is the main source of information:
- Class/Lecture time:
 - Lecture ($\sim 1/2$ time)
 - Presentations and discussion ($\sim 1/4$ time)
 - Exercises (some during lecture/class time, some to do on your own) ($\sim 1/4$ time)

Themes of the lecture – numbering used in Moodle

1. Introduction
2. Thermal risks assessment
3. Calorimetric methods
4. Decomposition reactions, Heat accumulation conditions
5. Mastering exothermal reactions
6. Risk reducing measures
7. Gas/Vapor and Dust Explosions
8. Case Study on thermal risk assessment

Lecture on Chemical Process Safety - Methodology

- Orientation towards industrial practice
 - Case studies
 - Theoretical bases
 - Transfer to practical aspects
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- If I have assumed you know something and you haven't learnt about it, please let me know!!

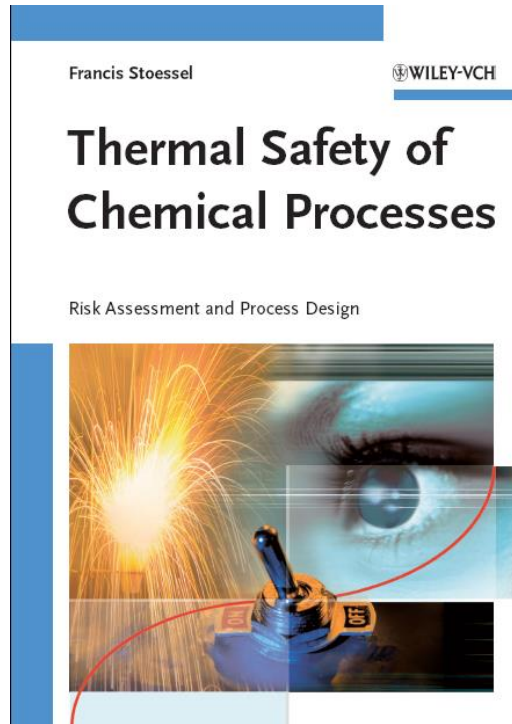
Lectures – Planned program, might change

#	Date	Contents	Slides (Modules)	Exercises
1	17.9	1. Introduction - Process safety 2. Thermal risks assessment	1. Introduction 2. Systematics	Exercises will be loaded on Moodle Solutions will be loaded on Moodle at appropriate times
2	8.10	2. Thermal risk assessment 3. Calorimetric methods	2. Systematics 3. Calorimetry	
3	29.10	4. Decomposition reactions 4. Autocatalysis	4. Thermal Stability 4. Autocatalysis	
4	12.11	4. Heat accumulation conditions 5. Mastering exothermal reactions	4. Heat Accum. 5. Reactors	
5	19.11	5. Mastering exothermal reactions 6. Risk reducing measures	5. Reactors 6. Criticality-Measures	
6	26.11	7. Explosion protection	7. Explosions	
7	10.12	8. Case Study	8. Case Study	

- Thermal Safety of Chemical Processes by Francis Stoessel

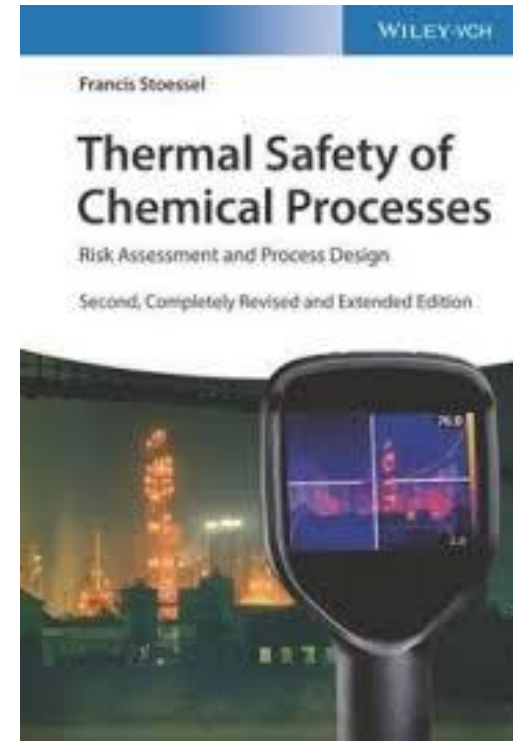
1st edition 2008

Downloadable via EPFL library (search for Thermal Process Safety)



2nd edition 2020

Downloadable via EPFL library (search for Thermal Process Safety)
A lot of solved exercises



Exam

- Written Exam (3 hours) during exam session max. 4.5 points
- Oral group presentation max 0.5 points

- Exam:
 - Multiple choice
 - Questions
 - Exercices/Problems

- ! Not only calculations but also questions about content ensuring that concepts have been understood
- Material: one recto-verso A4 sheet with notes etc

Case Histories Program as of 15.9.2025

Date	Case Study	Student	Student	Student
08.10.2025	13: BP America	Aktas Feriha Mesra	Enzinger Méloé	Maiga Ismael Amadou
08.10.2025	02: Distillation	Azalbert Oriane Leslie Marie	Fracassi Ludovica	Martinelli Alyssa
08.10.2025	24: Hazards of Benzoyl peroxide	Bedouelle Guillaume François Nicolas	Georges Téó Alec	Masson Aurélie Valentine
29.10.2025	18: Texas Tech	Belgharbia Emna	Hajj Hannah	Meireles Rainho Ricardo
29.10.2025	03: DMSO	Bénier Lucie Andrée Anastasie	Hamouni Inès Santina Agnès	Mourot Léa Claire Pascale
29.10.2025	23: Shell Moerdijk explosion	Bonaldi Pietro	Hendratta Jessica Annabelle	Nuñez Gonzalez Jorge Mario
12.11.2025	16: Heat exchanger	Boos Angie Alice	Hosko Adam	Pang Jia En
12.11.2025	19: Toxic release	Brand Emma Charlotte Marie	Jorovic Visnja	Perrot Clotilde Marie Virginie
12.11.2025	25: Kuraray America	Buffet Lilou Elisa	Kappeler Emma Margareta	Rodrigues Dos Santos Correia Miguel Ângelo
19.11.2025	08: Amination	Canda Alina Elizabeth	Khalife Nadim	Rosseneu Oscar Louis
19.11.2025	22. KMCO fatal equipment rupture	Casalprim Perez Arnau	Khoury Hanna Elie	Salafranca Martinez Juan
26.11.2025	14: Buncefield	Christiansson Thomas Viking	Kiliçer Yusuf Nazim	Santos Martins Diogo
26.11.2025	09: Ink dust explosion	Contreras Fernandez Alba	Kohany Alanna Fion	Sequeira Nichelle Christine
26.11.2025	21: Fatal accident reactor	Dengler Ella Elise	Laplanche Ysée Kris	Sermet-Magdelain Simon
10.12.2025	17: Metal dust Flash Fires	Díaz Hernández Karina Desireé	Lin Yuqin-Ada	Suharlim Wilson Noel Prajna
10.12.2025	26: Wacker HCl release	Droux Léa	Lippsmeier Julien Bernhard	Tee Jie Xi
10.12.2025	10: Static spark	Eggli Chloé	Loewen Philippe	Véron Clara Galadrielle

EPSC conference

- EPSC: european process safety center
 - Working groups
 - Guidance documents
 - Common views
 - Tools



EPSC - European Process Safety Centre

Industry Working Together on Process Safety

- 13, 14th September 2022 in Antwerpen
 - Free participation for one EPFL Student (following the class in 2020)
- 13&14th of December 2023 in Maastricht (MECC)
 - Free participation for one student following the class in 2022
- 2nd and 3rd of December 2024 in Barcelona
 - Free participation for two student from class in 2023 → extremely positive feedback from the students
- 16&17th December 2025 in Aachen
 - Free participation for students from class in 2024
- 2026
 - Free participation for students from your class