

ENG-431

Safety of chemical processes

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Cursus	Sem.	Type
Ing.-chim.	MA1, MA3	Obl.

Language of teaching	English
Credits	2
Session	Winter
Semester	Fall
Exam	Written
Workload	60h
Weeks	14
Hours	2 weekly
Courses	2 weekly
Number of positions	

Summary

The focus of the lecture is on reactive hazards (thermal process safety), but explosion protection and reliability of risk reducing measures (concept of SIL) are considered. While being based on theory, the lecture is oriented towards industrial practice. The lecture is 7x 4h.

Content

- Thermal process safety, systematic procedure for the assessment of thermal risks, analysis of incidents
- Fundamental aspects of thermal safety, calorimetric methods
- Decomposition reactions, characterisation, autocatalytic reactions, heat accumulation conditions
- Safe chemical reactors: criteria for the choice of the best suited reactor type and design
- Technical aspects of process safety, choice of risk reducing measures
- Safety of physical unit operations, explosions
- Reliability of technical systems

Keywords

Runaway
 Reaction
 risk assessment
 Explosion protection
 Reliability
 Reactive Hazards
 Thermal process safety

Learning Prerequisites**Required courses**

Basic chemistry and chemical engineering courses

Recommended courses

Thermochemistry
 Reaction kinetics

Learning Outcomes

By the end of the course, the student must be able to:

- Assess / Evaluate thermal risks
- Propose risk reducing measures
- Design an experimental plan
- Characterize a runaway reaction
- Exploit calorimetric measures
- Identify explosion risks
- Discuss reliability of protection measurement

Transversal skills

- Take account of the social and human dimensions of the engineering profession.
- Take responsibility for health and safety of self and others in a working context.

Teaching methods

The course is given as a series of lectures. Case studies prepared by the students will be used to introduce each topic. Some exercises will be done during the lecture, others will be left for the student to do on its own. Solutions to all exercises will be provided.

Assessment methods

The final grade will be the combination of the case study presentations (10%) and the final written exam (90%).

Resources

Ressources en bibliothèque

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Références suggérées par la bibliothèque

- [Thermal safety of chemical processes / Stoessel](#)