









Teacher(s)	Simar Aude ;
Language :	French
Place of the course	Louvain-la-Neuve
Main themes	The course describes the nature of the major industrial hazards, introduces the physico-chemical modelling of the source term, the modelling of the dispersion of effluents, the design of safeguard systems, and the existence of the human factor. Moreover, it describes the context in which the engineer operates (economic, social and legal constraints), and introduces the safety culture and the quality culture.
Learning outcomes	<p><b>At the end of this learning unit, the student is able to :</b></p> <p>Considering the AA reference list of the programme "Master in Mechanical Engineering", this course contributes to the development , the acquisition and the evaluation of the following learning outcomes :</p> <ul style="list-style-type: none"> <li>• AA1.1, AA1.2, AA1.3</li> <li>• AA2.3, AA2.4, AA2.5</li> <li>• AA3.1, AA3.2</li> <li>• AA5.1, AA5.5, AA5.6</li> <li>• AA6.1, AA6.2</li> </ul> <p>More precisely, at the end of the course, the student will be able :</p> <ul style="list-style-type: none"> <li>• to understand the notion of industrial risk, in particular via several major reference technological disaster</li> <li>• to use some techniques of evaluation and management of technological risks.</li> </ul>
Evaluation methods	<ul style="list-style-type: none"> <li>• Presentation of an accident and its conclusions and lessons-learned</li> <li>• Evidence of a visit to a SEVESO site and a report analyzing the safety and environmental issues (pollution, waste) of the SEVESO site visited.</li> <li>• Report on the role-play, its preparation and conduct, including a brief assessment of the role-play by each member of the group</li> <li>• An in-session oral examination</li> </ul> <p>Weighting: Accident presentation: 15%; SEVESO report: 25%; role-play report: 25%; oral: 35%. Generative AIs such as ChatGPT, Consensus, Perplexity, etc. may not be used to produce the evaluated reports.</p>
Teaching methods	<p>Courses taught <b>in French</b></p> <ul style="list-style-type: none"> <li>• Lectures</li> <li>• Seminars given by speakers from industry and academia</li> <li>• Plant visits (self-organized)</li> <li>• Presentation by student groups of major accidents and lessons learned</li> <li>• Role-playing games</li> </ul>
Content	<p>NOTE: due to the large number of external lecturers, the course and seminars are <b>taught in FRENCH</b>. It will be allowed to ask questions in english and answer to the exam in english.</p> <p>Lecture-based course to develop a global approach to major technological risks in industry. External lecturers are frequently called upon.</p> <p>For example:</p> <ul style="list-style-type: none"> <li>• Practical and operational aspects of industrial risk management</li> <li>• Biological risks</li> <li>• Cyber security</li> <li>• Nuclear safety</li> <li>• Risk analysis</li> <li>• Runaway chemical reactions</li> <li>• Human factor</li> <li>• Crisis center management</li> <li>• Major accidents and lessons learned</li> <li>• ...</li> </ul>

Inline resources	<a href="https://moodle.uclouvain.be/course/view.php?id=1161">https://moodle.uclouvain.be/course/view.php?id=1161</a>
Bibliography	<p>Support de cours : Transparents du cours et des séminaires</p> <p><b>Références conseillées:</b></p> <ul style="list-style-type: none"> <li>• Risques et accidents industriels majeurs: caractéristiques, réglementation, prévention, Nichan Margassian, L'usine nouvelle.</li> <li>• Méthodes d'analyses des risques, 3ème édition, Techniques de l'ingénieur.</li> <li>• Learning from Accidents, Trevor Kletz, Gulf Professional Publishing</li> <li>• Hazop and Hazan, 4th edition, Trevor Kletz, IChemE</li> <li>• Still going wrong!, Trevor Kletz</li> <li>• What went wrong?, Trevor Kletz, Gulf Professional Publishing</li> <li>• Emerging Technological Risk: Underpinning the Risk of Technology Innovation, S. Anderson, M. Felici, Springer</li> <li>• Risk in Technological systems, Grimvall, Holmgren, Jacobsson, Thedeén, Springer.</li> </ul>
Faculty or entity in charge	MECA

Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Learning outcomes
Master [120] in Environmental Science and Management	ENVI2M	3		
Master [120] in Chemical and Materials Engineering	KIMA2M	3		
Certificat universitaire de contrôle physique en radioprotection (Classe I)	RCPA9CE	3		
Master [120] in Biomedical Engineering	GBIO2M	3		
Master [120] in Mechanical Engineering	MECA2M	3		
Interdisciplinary Advanced Master in Science and Management of the Environment and Sustainable Development	ENVI2MC	3		
Master [120] in Electro-mechanical Engineering	ELME2M	3		
Master [120] in Mathematical Engineering	MAP2M	3		
Master [120] in Energy Engineering	NRGY2M	3		