Course Title	Loss Prevention and Process Safety in the Oil, Gas, Petrochemical and Chemical Industries				
Course Code	OSH630				
Course Type	Optional				
Level	Master (2nd Cycle)				
Year / Semester	1st year/ 2nd semester				
Teacher's Name	TBA				
ECTS	10	Lectures / week	3 hours / 14 weeks	Laboratories / week	N/A
Course Purpose and Objectives	Many aspects of process operations and their associated hazard inventories can be improved including, product recoveries, energy utilization, and safety. This cannot be achieved without first an understanding of basic fundamental principles of risk assessment and decision making. For the loss prevention and risk control to be effective, these principles need to be understood in advance of operating and trouble shooting a process unit operation or site. Moreover, as many such processes and substance inventories are defined as major hazards under the EU Major Hazards Directive EC82/96, many aspects of preventing and controlling losses will necessarily contribute to compliance with the Directive thus avoiding, where possible, unnecessary duplication of major hazard risk management effort.				
Learning Outcomes	Upon successful completion of this course students should be able to: Perform Qualitative Risk Assessments (QRA) - Manually and by use of specialist computer software Handle Safety Statistics - the importance, collection and use of published statistics and previous case studies in process safety Establish Safety Management Systems (SMS) - Implementation of effective SMSs and their impact on risks and risk assessment Perform hazard identification - Checklists, Failure Modes and Effects Analysis (FMEA) and criticality identification (FMECA) Apply Hazard and Operability Studies (HAZOPS) and participate as a HAZOP Chairman or Secretary Use effectively Fault Tree Analysis (FTA) and Event Tree Analysis (ETA), including structured development and use of probabilistic trees Use advanced techniques such as: (FMECA), Structured What-If (SWIFT) risk matrix Extend and collate all the above loss prevention techniques and activity into a coherent compliance with EU Major Hazards Directive (Seveso II) EC82/97EC, including Article 7 MAPP (Major Accident Prevention Policy including SMS and risk assessments), Article 8 (preventing domino effects) and Article 9 (detailed safety reports on MAPP and SMS effectiveness) Compile statutory Safety Reports and/or Safety Cases for defined major hazard sites, installations or operations				

<table>
<tr><td></td><td colspan="3">Apply a realistic balance of qualitative information in risk decision making i.e. not based on QRA alone or dominated by it.</td></tr>
<tr><td>Prerequisites</td><td>None</td><td>Required</td><td>None</td></tr>
<tr><td>Course Content</td><td colspan="3">Process safety risks. High energy processes and high energy/high toxicity substance inventories. Major accident causes, consequences and preventative action. Personnel health and safety. SMS and MAPP. Process safety analysis. Loss prevention. Process safety in design. Process safety in operations. Defining and quantifying risk. Checklists. Hazard and operability analysis (HAZOP) studies. Hazard analysis (HAZAN) techniques. Human factors and human error in major hazard accidents. Linking HAZOPS, process control, instrumentation and alarm systems. Cost of plant safety. Environmental impact. Case studies of serious plant accidents e.g. Buncefield, BP Grangemouth, Flixborough, Piper Alpha, BP Deepwater Horizon, PetroChina Jilin, Mari-Vassilikos EU Major Hazards Directive 82/96 requirements on site owners and operators. Preparation and content of Safety Reports. Preparation and content of Safety Cases.</td></tr>
<tr><td>Teaching Methodology</td><td colspan="3">Face-to-Face</td></tr>
<tr><td>Bibliography</td><td colspan="3">Required Reading(s):

Frank Lees, Lees' Loss Prevention in the Process Industries: Hazard Identification, Assessment and Control (3 Volumes), Latest Edition Butterworth-Heinemann, ISBN-10: 0123971896

Recommended reading(s):

Alan Waring, Corporate Risk and Governance: An End to Mismanagement, Tunnel Vision and Quackery Latest Edition, Routledge, ISBN-10: 9781138274761

Journal of Loss Prevention in the Process Industries, Elsevier, ISSN: 0950-4230</td></tr>
<tr><td>Assessment</td><td colspan="3"><table><tr><td>Examinations</td><td>60%</td></tr><tr><td>Class Participation and Attendance</td><td>10%</td></tr><tr><td>Project</td><td>30%</td></tr><tr><td></td><td>100%</td></tr></table></td></tr>
<tr><td>Language</td><td colspan="3">English</td></tr>
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