



## COURSE DATASHEET

<b>Semester:</b>	2016/17/1
<b>Course:</b>	Chemical Process Safety
<b>Code:</b>	VEMKTE3222S
<b>Responsible department:</b>	Department of Hydrocarbon and Coal Processing
<b>Department code:</b>	MKOL
<b>Responsible instructor:</b>	dr. Zoltán Varga

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### Course objectives:

To develop an awareness of the sources of hazards which are in connection with chemical substances, unit operations and chemical processes. They get acquainted with the equipments, systems and methods that can be used for control these hazards and with the basis and methods of hazard identification and analysis.

### Course content:

1. Introduction to safety and loss prevention. Accident statistics. Safety and loss prevention in different states of process design. Case study. 2-3. Toxic properties of chemical substances. Releases and dispersion in the air of chemical substances (source models, dispersion models). 4-5. The measurement and control of work place hazards. (Chemical substances, noise, etc.) Personal protective equipments. 6. Fire and explosion properties of chemical substances. (Flammability ranges, static hazard, etc.) 7. Types of explosions, estimating the energy of explosion - TNT equivalent method. Control of fires and explosions in the chemical process industries. Hazardous area classification. 8. Types of pressure relief devices; treatment of the discharged material. 9. Sizing pressure relief devices for gas/liquid systems. 10. Examination paper. 11. Introduction to hazard identification and analysis. Risk and hazard. Relative ranking of hazards. 12. Hazard and Operability Studies - method and an example. 13. Fault Tree Analysis - method and an example. 14. Quantification of hazards. Risk assessment 15. Presentation of the case studies.

### Requirements, evaluation and grading:

Types of Practical Exercises (Assignments) for Students: 1. The students should solve examples that are in connection with the topics of the seminars. 2. Oral presentation of a case study based on a real accident. Assessment is based on the examination paper. Score: 0 - 25 fail 25.5 - 31 pass 31.5 - 38 medium 38.5 - 45 good 45 - 50 excellent

### Required and recommended readings:

1. DANIEL, A.C., LOUVAR, J.F.: Chemical Process Safety: Fundamentals with Applications. Prentice-Hall Inc., New Jersey, 1990. 2. Guidelines for Engineering Design for Process Safety, AIChE-CCPS, New York, 1993. 3. VARGA, Z.: Biztonságtechnika, Veszprémi Egyetem, jegyzet, 1995. 4. Guidelines for Process Safety Fundamentals in General Plant Operations, AIChE-CCPS, New York, 1995. 5. LIPTON, S. és LYNCH, J.: „Handbook of Health Hazard Control in the Chemical Process Industry”, Wiley, New York, 1994. 6. LEES, F.P.: „Loss Prevention in the Process Industries Vol. 1-3.”, Butterworth, Oxford, 1996. 7. Kun-Szabó, T.: Munkavédelem, Veszprémi Egyetemi Kiadó, Veszprém, 1997.