

SYLLABUS
Academic year 2021-2022

1. Information regarding the programme

1.1. Higher education institution	Universitatea Babeş-Bolyai
1.2. Faculty	Faculty of Environmental Science and Engineering
1.3. Department	Environmental Analysis and Engineering
1.4. Field of study	Environmental Analysis and Engineering
1.5. Study cycle	Master
1.6. Study programme / Qualification	Sustainable Development and Environmental Management

2. Information regarding the course

2.1. Name of the course	Risk assessment and disaster management (RADIM)						
2.2. Code	NME8312						
2.3. Course coordinator	Professor Alexandru Ozunu, PhD						
2.4. Seminar coordinator	Professor Alexandru Ozunu, PhD						
2.5. Year of study	1	2.6. Semester	II	2.7. Type of evaluation	E	2.8. Type of course	Compulsory, DS

3. Total estimated time (hours/semester of didactic activities)

3.1. Hours per week	4	Of which: 3.2. lecture	2	3.3 seminar/laboratory	2
3.4. Total hours in the curriculum	56	Of which: 3.5. lecture	28	3.6. seminar/laboratory	28
Time allotment:					hours
Learning using manual, course support, bibliography, course notes					20
Additional documentation (in libraries, on electronic platforms, field documentation)					9
Preparation for seminars/labs, homework, papers, portfolios and essays					18
Tutorship					2
Evaluations					2
Other activities: Exam preparation					18
3.7. Total individual study hours					69
3.8. Total hours per semester					125
3.9. Number of ECTS credits					5

4. Prerequisites (if necessary)

4.1. curriculum	-
4.2. competencies	-

5. Conditions (if necessary)

5.1. for the course	Course classroom with videoprojector, computer, online access
5.2. for the seminar /lab activities	Seminar classroom with videoprojector, computer, online access

6. Specific competencies acquired

Professional competencies	<p>C1. Collection, processing, and analysis data regarding the interaction between Risk Management and Emergency Management and the external environment</p> <p>C2. Application of professional ethics principles, norms and values within one's own rigorous, effective and responsible work strategies.</p> <p>C3. Running specific risk assessment studies and emergency plans.</p>
Transversal competencies	<p>CT1. Implementing ethical principles, norms, and values within one's own rigorous, efficient, and responsible strategy of work</p> <p>CT2. Identifying the roles and responsibilities in a multispecialty team and implementing various relational techniques and efficient teamwork</p>

7. Objectives of the course (outcome of the acquired competencies)

7.1. General objective of the course	<ul style="list-style-type: none"> The course aims to provide students with the basic information on critical skills for Environmental Professionals
7.2. Specific objective of the course	<ul style="list-style-type: none"> Presentation the main concepts for Risk Management Presentation of main Emergency Strategies and Methods

8. Content

8.1. Course	Teaching method	Remarks
1. Risk management vs. emergency management	Interactive presentation, PPT presentation, student participatory presentation.	Definitions, concepts
2. Critical skills for environmental professionals	Interactive presentation, PPT presentation, student participatory presentation.	Critical skills for environmental professionals
3. Main steps in environmental risk management	Interactive presentation, PPT presentation, student participatory presentation through the analysis of applied home assignments	Milestone and algorithms in RM
4. Main steps in environmental emergency management. Disaster cycle.	Interactive presentation, PPT presentation, student participatory presentation through the analysis of applied home assignments	Milestone and algorithms in DM
5. Qualitative environmental risk analysis	Interactive presentation, PPT presentation, student participatory presentation through the analysis of applied home assignments	Methods and validated software
6. Quantitative environmental risk analysis	Interactive presentation, PPT presentation, student participatory presentation through the analysis of applied home assignments	Methods and checklist
7. Environmental risk and emergency management and land use planning	Interactive presentation, PPT presentation, student participatory presentation through the analysis of applied home assignments	The influence of the RM and EM on LUP
8. European civil protection mechanism (EUCPM)	Interactive presentation, PPT presentation, student participatory presentation through the analysis of applied home assignments	To understand the EUCPM
9. Vulnerability and resilience in sustainable development strategies	Interactive presentation, PPT presentation, student participatory presentation through the analysis of applied home assignments	Types of vulnerabilities; the role in sustainable development

10. Emergencies response plans for natural disasters	Interactive presentation, PPT presentation, student participatory presentation through the analysis of applied home assignments	To understand the influence of NH in ERP (emergency response plan)
11. Emergencies response plans for major industrial accidents involving dangerous substances	Interactive presentation, PPT presentation, student participatory presentation through the analysis of applied home assignments	To understand the influence of TECH in ERP
12. SPHERE project for minimal standards in disaster management	Interactive presentation, PPT presentation, student participatory presentation through the analysis of applied home assignments	To understand the minimal standards in DM
13. Early warning (EW) in disaster management and IT solutions	Interactive presentation, PPT presentation, student participatory presentation through the analysis of applied home assignments	The importance of the EWS in disaster preparedness and prevention
14. Main databases and internet resources	Interactive presentation, PPT presentation, student participatory presentation through the analysis of applied home assignments	Summary
Bibliography	<ul style="list-style-type: none"> • Alexandru Ozunu, Ioan Nistor, Dacina Crina Petrescu, Philippe Burny, Ruxandra Mălina Petrescu-Mag, Resilient Society, Les Presses Agronomiques de Gembloux, 2017. • Marina van Geenhuizen, Alexandru Ozunu, Carmen Teodosiu, Environmental Pollution Prevention, Romanian Academy Publishing House, Bucharest, 2004. • Alexandru Ozunu, Călin Anghel: Evaluarea riscului tehnologic și securitatea mediului, Ed. Accent, Cluj-Napoca, 2007 (in romanian). • Frank P. Lees: Loss Prevention in the Process Industries: Hazard Identification, Assessment and Control, Second edition, United Kingdom, 1996. • Van den Bosch, C. J. H., Weterings R.A.P.M: „Yellow Book”: Methods for the Calculation of Physical Effects, Third edition, Committee for the Prevention of Disasters, Netherlands, 1997. • P.A.M. Uijit de Haag, B.J.M. Ale: „Purple Book”: Guidelines for Quantitative Risk Assessment, First edition, Committee for the Prevention of Disasters, Hague, 1999. • C. A. Ericson: <i>Hazard Analysis Techniques for System Safety</i>, Ed. Wiley-Interscience, New Jersey, 2005. • ***American Institute of Chemical Engineers (AIChE): <i>Guidelines for Chemical Process Quantitative Risk Analysis</i>, Second Edition, New York, 2000. • T. Kletz, <i>HAZOP & HAZAN. Notes on the Identification and Assessment of Hazards</i>, Institution of Chemical Engineers, Fourth Edition, UK, 1999. • N. Hyatt, <i>Guidelines for Process Hazards Analysis, Hazard Identification & Risk Analysis</i>, Ed. Dyadem Press, Ontario, 2003. • Gheorghiu A.-D., Török Z., Ozunu A., Antonioni G., Cozzani V., 2014, Comparative Analysis of Technological and Natech Risk for two Petroleum Products Tanks Located in a Seismic Area, <i>Environmental Engineering and Management Journal</i>, Vol.13/8, pp. 1887-1892. • GHEORGHIU A.-D., TÖRÖK Z., OZUNU A., ANTONIONI G., COZZANI V., 2014, Natech Risk Analysis in the Context of Land Use Planning. Case Study: Petroleum Products Storage Tank Farm Next to a Residential Area., <i>Chemical Engineering Transactions</i>, Vol. 36, pp. 439-445. • Gheorghiu A.-D., Török Z., Ozunu A., 2013, How Can Existing Risk Assessment Methodologies Be Used in a Systematic Manner, in the Extractive Mining Industry?, <i>Journal of Environmental Protection and Ecology</i>, Vol.14/4, pp. 1597-1607. • Zoltán TÖRÖK, Nicolae AJTAI, Adrian T. TURCU, Alexandru OZUNU - Comparative consequence analysis of the BLEVE phenomena in the context on Land Use Planning; 	

	<p>Case study: The Feyzin accident, <i>Process Safety and Environmental Protection</i>, 89 (2011) pp. 1-7.</p> <ul style="list-style-type: none"> • TÖRÖK, Z., OZUNU, A., CORDOŞ E., Chemical risk analysis for land-use planning. I. storage and handling of flammable materials, <i>Environmental Engineering and Management Journal</i>, January 2011, Vol.10, No. 1, 81-88. • http://ec.europa.eu/environment/seveso/index.htm • http://mahb.jrc.it/index.php?id=9 • European Council Directive on the major accident hazards of certain industrial activities, Directive 82/501/EEC, 24 June 1982, European Community, Brussels, Belgium • EPSC, 1994, <i>Safety Management Systems: Sharing Experiences in Process Safety</i> (Institution of Chemical Engineers, Rugby, UK) • OSHA, 1992, <i>Process Safety Management of Highly Hazardous Chemicals</i>, Title 29, Code of Federal Regulations (Occupational Safety and Health Administration, Department of labor, Washington, DC, USA) • Bob Skelton: <i>Process Safety Analysis. An Introduction</i>, Institution of Chemical • Blaikie, P., Cannon T., Davis, I., Wisner, B. (1994), <i>At Risk: Natural Hazards, People's Vulnerability and Disasters</i>, Routledge, London • Walker, G., Simmons, P., Irwin, A., Wynne, B., - Risk communication, public participation and the Seveso II Directive, <i>Journal of Hazardous Materials</i>, Volume 65, Issues 1-2 , 1 March 1999, Pages 179-19 • Birkmann, J. (Ed.), (2006), <i>Measuring Vulnerability to Natural Hazards—Towards Disaster-Resilient Societies</i>. United Nations University, Tokyo, New York. • Renn, O., (2009), <i>Risk Communication: Insights and Requirements for Designing Successful Communication Programs on Health and Environmental Hazards</i>, in <i>Handbook of risk and crisis communication</i>/Robert L.Heath and H.Dan O'Hair, editors.—1st ed. • Villagrán De León, Juan Carlos, (2006), <i>Vulnerability: A Conceptual and Methodological Review</i>, Studies of the University: Research, Counsel, Education, Publication Series of UNU-EHS, No.4/2006 • ISDR (2004), <i>Living with Risk: A global review of disaster reduction initiatives</i>, International Secretariat for Disaster Reduction, Geneva • United Nations Environment Programme, (1988), <i>Awareness and Preparedness for Emergencies at Local Level: a Process for Responding to Technological Accidents</i>, ISBN 92-807-1183-0
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8.2. Seminar / project work	Teaching method	Remarks
1.Definitions and concepts in DM	Exemplification, analysis, case studies	Discussions following the world café talks on the subject
2. Definitions and concepts in EM	Exemplification, analysis, case studies	Discussions following the world café talks on the subject
3.Case study for environment risk management for a natural hazard	Exemplification, analysis, case studies	Floods, landslide, wildfires
4. Case study for environment risk management for a natural hazard (part 2)	Exemplification, analysis, case studies	Floods, landslide, wildfires
5. Case study for environment risk management for a technological hazard (part 1)	Exemplification, analysis, case studies	Chemical dispersion
6.Case study for environment risk management for a technological hazard (part 2)	Exemplification, analysis, case studies	Explosion

7. Safety distances and land use planning for Seveso establishment (part 1)	Exemplification, analysis, case studies	Chemical dispersion
8. Safety distances and land use planning for Seveso establishment (part 2)	Exemplification, analysis, case studies	explosion
9. Risk maps and consequences analysis.	Exemplification, analysis, case studies	
10. Case study for risk coverage plan (part 1)	Exemplification, analysis, case studies	Cluj County
11. Case study for risk coverage plan (part 2)	Exemplification, analysis, case studies	Cluj County
12. Case study for an internal emergency response plan for a Seveso establishment (part 1)	Exemplification, analysis, case studies	Chemical factory
13. Case study for an internal emergency response plan for a Seveso establishment (part 2)	Exemplification, analysis, case studies	.
14. Discussions on the home assignments	Exemplification, analysis, case studies	Summary

Bibliography	<ul style="list-style-type: none"> • Frank P. Lees: <i>Loss Prevention in the Process Industries: Hazard Identification, Assessment and Control</i>, Second edition, United Kingdom, 1996. • Van den Bosch, C. J. H., Weterings R.A.P.M: „Yellow Book”: <i>Methods for the Calculation of Physical Effects</i>, Third edition, Committee for the Prevention of Disasters, Netherlands, 1997. • P.A.M. Uijit de Haag, B.J.M. Ale: „Purple Book”: <i>Guidelines for Quantitative Risk Assessment</i>, First edition, Committee for the Prevention of Disasters, Hague, 1999. • C. A. Ericson: <i>Hazard Analysis Techniques for System Safety</i>, Ed. Wiley-Interscience, New Jersey, 2005. • ***American Institute of Chemical Engineers (AIChE): <i>Guidelines for Chemical Process Quantitative Risk Analysis</i>, Second Edition, New York, 2000. • T. Kletz, <i>HAZOP & HAZAN. Notes on the Identification and Assessment of Hazards</i>, Institution of Chemical Engineers, Fourth Edition, UK, 1999. • N. Hyatt, <i>Guidelines for Process Hazards Analysis, Hazard Identification & Risk Analysis</i>, Ed. Dyadem Press, Ontario, 2003. • Covello, V.T. “Trust and Credibility in Risk Communication”, <i>Health and Environment Digest</i>, April 1992, 6 (1), pp. 1-3. • Brauch, H.G., (2005), <i>Threats, Challenges, Vulnerabilities and Risks in Environmental and Human Security</i>, United Nations University, nr. 1/2005 • Michael Regester, Judy Larkin, "Managementul crizelor și al situațiilor de risc", Ed.Comunicare Ro, București, 2003. • Birkmann, Joern, (2007), Risk and vulnerability indicators at different scales: Applicability, usefulness and policy implications, <i>Environmental Hazards</i> 7 (2007) 20–31, ELSEVIER • Thywissen, Katharina (2006), <i>Components of Risk</i>, United Nations University, UNU-EHS Institute for Environment and Human Security, No. 2/2006, ISBN: 3-9810582-1-6 162.
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9. Corroborating the content of the course with the expectations of the epistemic community, professional associations and representative employers within the field of the program

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| <ul style="list-style-type: none"> • The discipline content is consistent with what is being taught in other universities at home and abroad. In order to adapt it to the labour market requirements, there were held meetings with business representatives. |
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10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation method	10.3 Share of final grade
10.4. Course	Knowledge of the presented theoretical concepts Correct application of theory to practice	Final examination	60%
10.5. Seminar/lab activities	Correct resolutions of exercises, case studies, projects	Tests/ projects during the semester	30%
	Interest in individual preparation, seriousness in addressing seminar work	Points for active participation in seminars	10%

10.6. Minimum performance standards

- Knowledge of the presented theoretical concepts
- Correct application of theory to practice through simple exercises/case studies.
- Understanding of economical meaning of results obtained

Date

28.04.2021


Signature of course coordinator

Alexandru OZUNU



Signature of seminar/project coordinator

Alexandru OZUNU



Date of approval

Signature of the Head of department