Risk management in the Black Sea Basin

**Syllabus**

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| Discipline’s code | Discipline’s title |  | | | Number of ECTS | SWST  Self-work of student with teacher in hours |
| Lect. | Pract. | Lab. |
| CMU-13 | Risk management in the Black Sea Basin | 42 | 20 | 26 | 4 |  |

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| Academic presentation of the course | **Aim of course:** to familiarize students with informations such as  - Major risks. Management of risk;  - Methods of risk analyses assessment and prevention;  - Main technological risks (methods and means);  - Environmental risk;  - Management of oil spill on sea –using SIMULATOR;  - Risk assessment / prevention methods (Assessment and analysis of environmental risk in the Black Sea);  - Economic risks in BSB;  - Health risk;  - Management of technological risks in seaports  **As a result of studying the discipline**, students should be able to:  - gain skills for risk management and assessment for prevention of ecological and technological risks;  - gain professional qualification on environmental, technological risks;  - upgrade education in area of risk managemnt in the Black sea;  - monitoring in a real time a database of oil spill risk areas, vulnerable zones and enforcing and planning prevention measures based on risk assessment for practical needs of education and management of prevention of risk;  - gain specialized knowledge and skills in the field of environmental risk.  - gain skilss for cooperation with stakeholders in the Black Sea Basin . |
| Prerequisites | Environmental risk concepts, Naval machines and installations, Ecology, Chemistry , Fluids Mechanics, Hydraulics, Computer programming and use, Mathematics, Physics |
| Post requisites | Risk management, modelling oil spill on sea, assessment environmental and technological risk |
| Information resources | **Literature:**  1. Panaitescu Fanel-Viorel, Panaitescu Mariana, Voicu ionut, Anton Iulia, Popa Constantin, Environmental risk concepts (Concepte de risc de mediu ), Nautica Publishing House Constanta, 2019.  2.Voicu Ionut, Panaitescu fanel-Viorel, Panaitescu Mariana, The management  prevention of pollution with petroleum products (Managementul prevenirii poluarii cu produse petroliere), Nautica Publishing House Constanta, 2017.  3. ASCE Task Committee on Modeling of Oil Spills of the Water Resources Engineering Division - State of the Art Review of Modeling Transport and Fate of Oil Spill, Journal of Hydraulic Engineering, Vol. 122, No. 11, 1996.  4. Chao, X., Shankar, N., J., Cheong, H., F. - Two and three dimensional oil spill model for costal waters, Ocean Engineering, No. 28, Elsevier Science Ltd., Great Britain, 2001.  5. Anne V. Whyte, Ian Burton – Environmental risk assessment - SCOPE 15. Institute for Environmental Studies, University of Toronto, Canada, 1990. ISBN 0 471 27701 0  6. Environmental risk assessment: an approach for assessing and reporting environmental conditions- Habitat branch, technical bulletin 1, Ministry of Environment, lands and parks, July 2000, ISBN 0-7726-4327-X.  7. Popa Constantin, Panaitescu Fanel –Viorel, Voicu Ionuț - Short introduction concerning the Black Sea oil pollution risk - Maritime University, Constanta, România – Article presented at the first IUCRISKMAN seminar, 2015.  8. Woodward, David G. (2002) Is the natural environment a stakeholder? Of course it is (no matter what the Utilitarians might say)! In, Critical Perspectives on Accounting Conference, New York, USA, 25 - 27 Apr 2002. New York, USA, Baruch College: City University of New York  9. Christo Coetzee, Dewald van Niekerk -Tracking the evolution of the disaster management cycle: A general system theory approach – article on <http://www.jamba.org.za>  10. European Parliament resolution of 13 December 2007 on the shipping disasters in the Kerch Strait in the Black Sea and the subsequent oil pollution.  11. A 2020 Vision for the Black Sea Region - a Report by the Commission on the Black Sea, May, 2010  12. Avelino I. Mondlane, Dr. Mohmoud Hassanien - Environmental risk assessment: An approach toward environmental hazard and disaster risk management 30th September 02nd October 2003 Environment 2003 Conference Cairo EGYPT.  13. Popa Constantin, Panaitescu Fanel –Viorel, Voicu Ionuț - Analysis of the Black Sea oil pollution, considering offshore drilling activities - Maritime University, Constanta, România – Article presented at the first IUCRISKMAN seminar  14. Danube pollution reduction programme - Causes and effects of eutrophication in the Black Sea - Summary report - prepared by Joint Ad-hoc Technical Working Group ICPDR – ICPBS, JUNE 1999.  15. James Phipps - The application of THESIS Bow-Ties in marine safety management – Tanker Operator, September 2006, pag 35-36  16. Delgado, L., Kumzerova, E., Martynov, M., Mirnyj, K., Shepelev, P. - Dynamic simulation of marine oil spills and response operations. Coastal Engineering VII. Modeling, Measurements, Engineering and Management of Seas and Coastal Regions, Ed. Brebbia C. A., M. de Conceicao Cunha, 2005.  17. Delgado, L., Kumzerova, E., Martynov, M. - Simulation of oil spill behavior and response operations in PISCES, WIT Transactions on Ecology and the Environment, Vol 88, Environmental Problems in Coastal Regions VI, 2006.  18. Gogoaşe, Nistoran, D., Pincovschi, I. - Modeling of Oil Spreading on Still Water Surface - Part 1 Theoretical consideration and oil properties, Conferința Internațională de Energie și Mediu (CIEM), București, 2003.  19. Ornitz, B., E., Champ, M., A. - Oil Spills First Principles: Prevention and Best Response, Elsevier Science Ltd, Amsterdam, Netherlands, 2002.  20. Voicu, I., Panaitescu, F., V., Panaitescu, M., Panaitescu, V., N., Panaitescu, V., A. - Oil leakage simulation and spill prediction from sunk ship Paris, near Constanta harbor, Proceedings of the 7th International Conference on Management of Tehnological Changes, Alexandroupolis, Greece, 2011.  21. Voicu, I., Panaitescu, V., N. Oil pollution of the seas and oceans (Poluarea cu petrol a mărilor şi oceanelor), Conferinţa Ştiinţifico-Practică Internaţională „Edificarea Societăţii Durabile” 27-28 octombrie 2011 Chişinău, Republica Moldova, Secţia IV - Protecţia Mediului Înconjurător în Sporirea Calităţii Vieţii Omului, 2011.  22. Voicu, I., Panaitescu, V., N., Popa, C. - Computer Simulation of an Emergency Situation - accidental discharge of hydrocarbons in the Black Sea, The International Conference on Water Resources and Wetlands, Tulcea 14-16 september 2012, Editura Transversal, 2012.  23. Voicu, I., Panaitescu, V., N., Popa, C. - Computer simulation of an emergency situation, Constanta Maritime University’s Annals, Editura Nautica Constanţa, 2012.  24. Voicu I., Panaitescu, V., N., Popa, C. - Study of the evolution of an oil spill on water surface, Buletinul Științific al Universității „Politehnica” din București, Vol. 76, Nr. 1, Seria D, Bucureşti, 2014.  25. Voicu, I., Panaitescu, F., V., Panaitescu, V., N., Panaitescu, M. - Comparative study on the spread of petroleum products on the water surface, Proceedings of the 4th International Conference on Development, Energy, Environment, Economics (DEEE’13), Paris, France, 2013.  26. Voicu, I. Management of emergency situations as a result of accidental discharge of petroleum products in the Black Sea, PhD Thesis, "Politehnica" University of Bucharest, 2013. (Gestionarea unor situații de urgență ca rezultat al deversării accidentale de produse petroliere în Marea Neagră, Teză de doctorat, Universitatea „Politehnica” Bucureşti, 2013).  27. Voicu, I., Dumitrescu, L., G., Panaitescu, V., N., Panaitescu, F., V. Financial implications of an oil spill inside the Constanța Seaport aquarium (Implicațiile financiare ale unei deversări de produs petrolier, în interiorul acvatoriului Portului Maritim Constanța), The 16th International Multidisciplinary Conference „Professor Dorin Pavel - the founder of Romanian hydropower” Sebeş – Alba, 10-11 June 2016, Ştiinţă şi inginerie, Vol. 30/2016, AGIR publishing House, Bucureşti, 2016.  28. Voicu, I., Dumitrescu, L., G., Panaitescu, V., F., Panaitescu, M. - Studies on the oil spillage near shorline, The 5th International Conference on Modern Manufacturing Technologies in Industrial Engineering - Sibiu, 14-17 June 2017, Book of Abstracts, ModTech Publishing House, 2017.  29. Panaitescu F.V., Panaitescu M., Training pentru evaluarea, controlul si simularea unor situatii de criza pe simulatorul PISCES II, July 2009, Conference: ACVADEPOL, Mamaia, Volume: 1, ISSN 2066 – 5962, 2009, Romania.  30. \*\*\*, PISCES29-PL Specifications, ver. 1.0, 2008.  **Internet-resources:**  <http://en.wikipedia.org/wiki/Stakeholder>  <http://www.oiledwildlife.eu>  <http://www.theepochtimes.com/news>  <http://en.for-ua.com>  <http://www.spiegel.de>  [www.blacksea-commission.org/\_publSOE2009.asp](http://www.blacksea-commission.org/_publSOE2009.asp)  [http://www.youtube.com](http://www.youtube.com/channel/UCTURPCB375YunOtddm-JB6A)  http://www.offshore-mag.com  <http://ro.wikipedia.org>  <https://www.csum.edu/>  <https://www.csum.edu/industry/simulation-center/pisces.html>  <https://www.anmb.ro/eng/files/cercetare/CCINM/2/PISCES_293-PLSpec.pdf>  <https://www.google.com/search?q=PISCES+II+Simulator&oq=PISCES+II+Simulator&aqs=chrome..69i57.7018j0j7&sourceid=chrome&ie=UTF-8>  <https://www.researchgate.net/publication/282733003_Training_pentru_evaluarea_controlul_si_simularea_unor_situatii_de_criza_pe_simulatorul_PISCES_II>  <https://www.wartsila.com/marine/voyage/simulation-and-training/navigation-and-bridge-simulators/oil-spill-response>  <https://www.scientificbulletin.upb.ro/rev_docs_arhiva/full96c_530127.pdf> |

**Calendar (schedule) the implementation of the course content:**

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| --- | --- | --- | --- |
| **Week / date** | **Topic title (lectures, practical classes, Independent work of students, IWS)** | **Number of hours** | **Maximum score** |
| 1 | 2 | 3 | 4 |
| 1 | **Lecture 1.** Major risks. | 4 | 10 |
| Practical class 1. Applications of major risks& management of risk. | 2 | 10 |
|  | Lab 1. Major future risks to the marine environment | 2 | 10 |
| 2 | **Lecture 2.** Methods of risk analyses assessment and prevention | 6 | 10 |
| Practical class 2. Sea level damage risk. | 2 | 10 |
|  | Lab 2. Risk assessment on the sea. Application to a cross-sea route. | 2 |  |
| 3 | **Lecture 3.** Management of risk. ISO Guide 73: 2009. Marine risks. | 6 | 10 |
| Practical class 3.  ISO Guide 73: 2009 - Definitions related to risk management .  The interaction betwen problem of climate change and major risk. | 2 | 10 |
| Lab 3. Predictions on the main risks for the marine environment in the next 20-50 years | 2 | 10 |
| **Self-work** of student with teacher: SWST.  *Theme and form of task*:  Risk management development framework.  Task:  - Understanding the analyzed entity in its context;  - PESTLE analysis;  - Establishing the risk management policy;  -Responsability;  - Integration in organizational processes;  -Resources;  - Establishing internal-external communication and reporting mechanisms;  - Implementation of risk management. | 10 | 10 |
| 4 | **Lecture 4.** Main technological risks | 6 | 10 |
|  | Practical class 4. Controlling of the industrial risk | 2 | 10 |
|  | Lab 4.Taxonomy of hazards. | 2 |  |
|  | **Self-work** of student with teacher: SWST. | 6 | 10 |
| 5 | **Lecture 5.** Technological risks associated with the behavior of liquids and compressed gases in loss of structural integrity. | 2 | 10 |
|  | Practical class 5. Relation between the physical properties and the behavior of liquids and compressed cases  in case of a spill.. | 2 | 10 |
|  | Lab 5. Physical properties determine the behavior in case of spills in the atmosphere and their  effectiveness, the possibility of degassing and identification. | 2 |  |
|  | **Self-work** of student with teacher: SWST.  *Theme and form of task*: Ability of substances to make aerosols. **S**olubility and solutions. Storage and transportation of the substances. | 10 | 10 |
| 6 | **Lecture 6.** Risk of failure of a pressurized vessel carrying capacity pressure, according the Committee of Advisers on the main hazards (CAMH) | 2 | 10 |
|  | Practical class 6 . Analysis of failures in systems | 2 | 10 |
|  | Lab 6. Case study with failures of an example of vessel. | 2 | 10 |
|  | **Self-work** of student with teacher: SWST.  *Theme and form of task*:  The specification of pressurized vessels.  Description of the sequence of operations in the design of the vessel  The technological scheme, technical parameters  Equipment - including an emergency waiver of the pressure, control instrumentation, drencher systems and others  Specific problems associated with certain substances  Design, Inspection and Development | 12 | 10 |
| 7 | **Lecture 7.** Major technological risk. Fires.Explosions. | 2 | 10 |
|  | Practical class 7. The process of combustion in case of fire.Characteristics of fires.  Taxonomy of explosions | 2 | 10 |
|  | Lab 7. Basic methods for termination of fire.  Bow Tie charts, another way to analyze technological and environmental risks.  BLEVE (Boiling Liquids and Expanding of Vapor Evaporation) mechanism. | 2 | 10 |
|  | **Self-work** of student with teacher: SWST.  *Theme and form of task*: Fire extinguishing means. Fire Extinguishing substances (FES), materials, fire vehicles and their equipment. BLEAVE case study. | 6 | 10 |
| 8 | **Lecture 8.** Environmental risk. Risk management. | 2 | 10 |
|  | Practical class 8. Risk assessment applied to environmental issues. Case analysis - the case of hydrocarbon pollution in the Black Sea. | 2 | 10 |
|  | Lab 8. Environmental risk assessment. The link between environmental risk assessment and disaster risk management. | 2 | 10 |
|  | **Self-work** of student with teacher: SWST.  *Theme and form of task*:  Environmental hazards and risk analysis.  Environmental degradation. Climate change. Human health.  Disaster risk, development and the environment  Methods of treating environmental risk | 10 | 10 |
| 9. | **Lecture 9.** Management of oil spill on sea -SIMULATOR | 8 | 10 |
|  | Practical class 9. Training on PISCES II simulator | 4 | 10 |
|  | Lab 9. Training on PISCES II simulator | 6 | 10 |
|  | **Self-work** of student with teacher: SWST.  *Theme and form of task*: Case study of oil spill . | 10 | 10 |
| 10. | **Lecture 10.** Health and economic risk | 4 | 10 |
|  | Practical class 10. Health risk. Case study. | 2 | 10 |
|  | Lab 10. Economic risk. Case study. | 2 | 10 |
|  | **Self-work** of student with teacher: SWST.  *Theme and form of task*:  The link between the oceans and human health: hazards, risks, benefits and opportunities from the sea  The public health challenges presented by the seas and oceans | 10 | 10 |