Course Title	Applications of Decision-Making Systems for the Environment				
Course Code	DLCLIMA517				
Course Type	Elective				
Level	MSc (Level 2)				
Year / Semester	2nd / 3rd				
Teacher's Name	Stavros Stathopoulos				
ECTS	7.5	**Lectures / week**		**Laboratories/week**	
Course Purpose	The aim of the course "Applications of Decision-Making Systems for the Environment" is the optimal use of decision-making systems for understanding, monitoring and addressing environmental problems caused by both natural and man-made factors. Through the synergy of deterministic and probabilistic methods, field measurements and remote sensing data, these systems serve to understand the link between human activities, climate change, biodiversity loss and environmental pollution. During this course the parameters of a decision-making system and the basic principles of its use and exploitation for both prevention and mitigation of a variety of environmental problems will be examined. Reference will be made to environmental risk assessment techniques and decision trees, the elements of which they are composed and the important role they play in the formulation of sustainable practices and policies for environmental protection. Also, the methodology for the understanding of an environmental problem and the optimal ranking of the parameters of that problem will be developed in terms of their riskiness. Through various case studies, the different approaches dealing with soil, water and air pollution issues using decision-making systems will be presented. After completing the course, students will not only be able to design and implement effective applications based on decision making-systems, but will also acquire the necessary skills for multi-level investigation of all kinds of environmental problems.				
Learning Outcomes	Upon successful completion of the course, students will be able to: • describe the elements of a decision-making system • explain the stages of decision-making				

	• justify their choices regarding the decision stages in solving a decision problem • relate the different parameters affected by an environmental problem • select the appropriate parameters and organize them appropriately to create a decision tree • perform a well-structured decision-making system to address environmental problems • develop a sustainable and effective decision-making system • cooperate in order to find the best practice for dealing with an environmental problem		
Prerequisites		**Corequisites**	
Course Content	• Introduction to Decision-Making systems • Environmental risk assessment • Satellite data as tools in the decision-making process • Application of decision making systems in water management • Application of decision-making systems to marine ecosystem management • Application of decision-making systems to soil and ecosystem protection • Application of decision-making systems to air pollution management		
Teaching Methodology	**Distance Learning** The course will provide the theoretical background through synchronous and asynchronous communication methods. The set of learning activities is supported by an electronic communication and learning platform. The main learning activities of the course are as follows: 1. Study of the required course literature. 2. Presentations of content or main points or specific studies in various formats (PowerPoint, oral presentations, annotated presentations). 3. Formulation and resolution of questions in a specialized forum.		

	4. Questions, quizzes, exercises, position papers, and other self-assessments. 5. Preparation of course assignments. 6. Participation in six video conferences.
Bibliography	**Textbooks** Selected chapters from: Jones, R.N., A. Patwardhan, S.J. Cohen, S. Dessai, A. Lammel, R.J. Lempert, M.M.Q. Mirza, and H. von Storch, 2014: Foundations for decision making. In: Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Field, C.B., V.R. Barros, D.J. Dokken, K.J. Mach, M.D. Mastrandrea, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L. White (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 195-228. Murty, M.N., Devi, V.S., 2011: Decision Trees. In: Pattern Recognition. Undergraduate Topics in Computer Science, Springer, London. https://doi.org/10.1007/978-0-85729-495-1_6 Gormley, A., Pollard, A., Rocks, S. 2011: Guidelines for Environmental Risk Assessment and Management - Green Leaves III, Department for Environment, Food & Rural Affairs. https://www.gov.uk/government/publications/guidelines-for-environmental-risk-assessment-and-management-green-leaves-iii Scientific Journal/Conferences Papers: Cantor, A., Kiparsky, M., Hubbard, S. S., Kennedy, R., Pecharroman, L. C., Guivetchi, K., et al., 2021: Making a water data system responsive to information needs of decision makers. Frontiers in Climate, 3, 761444. https://doi.org/10.3389/fclim.2021.761444

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	Electronics in Agriculture, 101, 55-67. https://doi.org/10.1016/j.compag.2013.12.005 Tan, Y., Xu, H., & Zhang, X., 2016: Sustainable urbanization in China: A comprehensive literature review. Cities, 55, 82-93. https://doi.org/10.1016/j.cities.2016.04.002 Wang, S., & Hao, J., 2012: Air quality management in China: Issues, challenges, and options. Journal of Environmental Sciences, 24(1), 2-13. https://doi.org/10.1016/S1001-0742(11)60724-9
Assessment	The assessment of the course includes formative, self-evaluation and summative assessment activities. Specifically, the assessment of this course includes the following: a final written exam, 2 assignments delivered during the semester, 3 dynamic online interactive activities and self-evaluation activities. The aim of the above educational activities and assignments is to consolidate the syllabus and the subject area. According to the preceding, the following are scored: • Final exam (50%) • 2 Assignments (15% + 20% =35%) • 3 Weekly Educational Activities (3 * 5% = 15%) Assignments are given and delivered through the online platform. The final examination and all assignments are graded from 0 to 100 with a minimum grade of half a point. Assignments (except the final) are uploaded and delivered through the online platform. Students have 2 weeks to complete and hand them in. It is at the discretion of each instructor to decide whether to grant an extension on the delivery of the assignments.
Language	Greek / English