Academic Year: 2019/2020

Course: Spatial Analysis and Risk Assessment

Coordinator: Susana Pereira

Teaching Staff: Eusébio Reis; Susana Pereira

ECTS: 6 **Weekly Hours:** 3,0 h **Typology:** Theoretical-practical

Contents

1. Risk model assessment: interpretation and structuring

2. Risks in Spatial Planning

3. Methods of susceptibility and hazard assessment in GIS

3.1. Comparison between spatial variables: spatial probabilities

3.2. Multi-Criteria Analysis for susceptibility assessment

3.3. Methods of bivariate analysis: Informative Value, Bayesian probability

3.4. Methods of multivariate analysis: Logistic Regression

3.5. Model validation

4. Spread of hazardous phenomena

4.1. General concepts related to spatial propagation of phenomena

4.2. Spatial spread assessment of hazardous phenomena

5. Examples of susceptibility and hazard analysis

Aquifer contamination, Forest wildfires, Slope mass movements, Soil erosion by water, Floods, Spread of invasive species and diseases, Technological risks

6. Identification and evaluation of Risks: examples

Objectives and skills

Objectives:

- contextualize the risks in the legal instruments of spatial planning;
- identify and connect the components of the models, for resolution of problems related with susceptibility and hazard assessment;
- test GIS methodologies for susceptibility quantification of several types of natural, environmental and technological phenomena;
- perform the validation of the model results.

Skills:

- know the concepts associated with the natural and environmental risk evaluation, and contextualize them in the politics and instruments of spatial planning;
- acquire skills in the geographical data integration in GIS, allowing the use of different empirical and statistical methods;
- know the several assessment methods and adapt them to specific types of phenomena;
- have a critical perception of models and perform validation of respective results.

References

Bryant E (2005) Natural Hazards. 2ª ed., Cambridge University Press, UK. 312p.

Burton I, Kates R W, White G F (2005) The Environment as Hazard. 2ª ed., The Guildford Press, New York/London. 284p.

Johnson L E (2009) GIS in Water Resources Engineering. CRC Press, UK. 315p.

Pine J C (2009) Natural Hazards Analysis: Reducing the Impacts of Disast. CRC Pr., UK. 295p.

Showalter P S, Lu Y (Eds.) (2010) Geospatial Techniques in Urban Hazard and Disaster Analysis. Geotechnologies and the Environment. Springer, London/New York. 452p. (2 vols).

Wisner B, Blaikie P, Cannon T, Davis I (2005) At Risk: natural hazards, people's vulnerability and disasters. 2ª ed., Routledge, London/New York. 447p.

Knowledge evaluation methods and their partial grades

1 practical work (65%); 1 individual theoretical-practical exercise; personal evaluation (5%).