

Unidade Curricular: Natural and Technology Risk Management

Área Científica: ENG

Duração: Semestral

Horas de trabalho: 121.5

Horas de contacto: 45

ECTS: 4.5

Observations: Option A - Example of course to offer to students. This course was already one of the options of the 1st year, 1st semester in the actual curricular structure.

Docente Responsável: José Augusto Paixão Coelho

Outros docentes: Manuel José de Matos

Learning outcomes of the curricular unit

1. To characterize the different risks, as natural origin, or technological, adjusting the profundity of treatment of each one to the existing knowledge on the process and to its national relevance.
2. Analyze the possibilities of quantification of the risks, protection and mitigate against that phenomena.
3. Present methodologies of risk analysis used, mainly in that ones of chemical origin, as at the industrial or laboratorial level. Apply simple models of analysis to the phenomena of risk previously related.
4. To know the national programs in the area of risk and its integration with developed at international level.
5. Contribute for the formation of a culture of security and safety in the students developing capacities and aptitudes for the professional, namely to written communication and verbal to the future life, understand the information and work in group

Syllabus

1. Historical cases, ecological and ambient impact
2. Accidents and fatalities. An overview of different natural risks.
3. Seismic and meteorological risks. Effects of the wind. Erosion and desertification.
4. Flooding and landslides.
5. Forest and urban fires. Strategies for the prevention of these phenomena.
7. Chemical and biological risks. Toxicology.
8. Industrial risks
9. Evaluation of risk and inquiry of accidents

Demonstration of the syllabus coherence with the curricular unit's learning objectives.

"The aims of the curricular unit are obtained through lectures and their respectively support elements (slides and presentations in ""data-show""), as well as the resolution of real incidents and study of application, in order to extend theoretical knowledge which are being transmitted and examples of practical applications. While the main competence acquired in this curricular unit is the ability to analyse and quantify and propose ways and mitigate risks in system it is necessary to study the main origins and previous cases and solutions to propose new future solutions for other studies.

Teaching methodologies (including evaluation)

The teaching methodology is developed on theoretical component during the 15 weeks of classes, with some practical examples, corresponding to 3.0 hours, making a total of hours of contact with the student of 45 hours. It is mandatory to be present in some seminars scheduled in advance at the beginning of the semester. There is still two hours of tutorial guidance as well with the availability of teaching staff to students' questions.

Continuous evaluation Presence in madding seminaries, to be defines at the beginning of the semester. Accomplishment of a development work, writing on a subject to consider. Presentation and oral argument of the work. The classification correspond 40% of the final classification. Written examination corresponding to the final classification of 60%.

Continuous evaluation:

Wrote test T with $T \geq 10$

Monographic work M ≥ 10

$$NF = 0.4 * M + 0.6 * T$$

Final exam evaluation:

Written examination E ≥ 10

Calculation of Final Grade (NF):

$$NF = 0.4 * M + 0.6 * E$$

Demonstration of the coherence between the teaching methodologies and the learning outcomes

In the lectures is given the corresponding program learning objectives. Theoretical sessions of 1.5 hours are trained the contents and analysed case studies on each of the subjects. This methodology allows the student the skills development and progressive gains at UC. The monitoring of lectures with the exposure of the contents properly covered practical examples allows students to assimilate, to formulate and interpret the results of the principles of mitigation processes and risk prevention applied to chemical engineering. Complementarily with tutorial support allows the application complementary tools in the studies. The realizations of small seminars for invitations to teachers of specialty, as well as the discussion of the monograph allow achieving the proposed objectives in a coherent way.

Mandatory consultation/existence bibliography:

1. D. A. Crowl, J.F.Louvar "Technical Process Safety: Fundamentals with Applications", Prentice Hall, 1990.
2. R. Turtonl, R.C. Bailie, W.B. Whiting, J.A. Shaeiwitz ""Analysis, Synthesis, and Design of Chemical Process""", 2ª Edition, Prentice Hall, 2003.
3. F.J. Ayala-Carcelo, J.O.C. Cantos, ""Riesgos Naturales""; Ariel Ciencia, 1ª edición, 2002.
4. E. Castillo, A.S. Hadi,N. Balakrishnan,J.M. Sarabia, "" Extreme Value and Related Models in Engineering and Science Applications""", N.Y. John Wiley & Sons, 2005.
5. J.P. Sousa, M.A. Rodrigues, "Riscos dos agentes biológicos: Manual de prevenção", 2ª Edição, Instituto de Desenvolvimento e Inspeção das Condições no Trabalho, Lisboa, 2001.
6. A.S.S.R. Miguel, "Manual de higiene e segurança de trabalho", 8ª Edição, Porto Editora, Porto, 2005.
7. R.Scott, "Basic Concepts of industrial Hygiene", Lewis Publishers, Boca Raton, New York, 1997.