

# MASTER DEGREE IN MICROBIOLOGY



## INDUSTRIAL SAFETY AND HEALTH – Instituto Superior Técnico

### Objectives:

Identification of the major hazards associated with substances and operations involved in chemical and biological processes. Distinction between hazard and risk. Identification of the main hazards in chemical /biological industrial operations: manipulation, transport and storage. Identification of hazards and risks at the work place. National legislation and EC Directives concerning safety (REACH, Globally Harmonized System). Risk evaluation and assessment directed to prevention. Individual and collective protection. Prevention of major industrial accidents (Seveso Directives). Industrial hygiene and good practices. Emergency plan. Perception and attitude for industrial safety

### Program:

1- Perspective of industrial safety. Hazardous substances and operations. 2- Identification of hazards and risks. Safety sheets. 3 – Exposition to chemical substances or biological agents. Relationship dose/effect. 4- Elimination kinetics. 5- Threshold limit values. 6- Industrial safety and good practices. 7- Globally harmonized system for labeling of hazardous substances – REACH. 8 – National legislation concerning chemical industry. 9 – Ventilation. 10 - Physical risks. Noise and vibrations. 11- Emerging risks (biological- and nano- materials, stress). 12- carriage of dangerous goods (e.g. ADR/RPE). 13 – Safety equipments: selection. 14- Prevention of major industrial accidents. Seveso Directives. 15- Hazardous industrial residues. Safety management: prevention and emergency. 17 – Risk assessment models and action plans. 18 – Emergency planning.

### Evaluation methodology

Continuous evaluation, considering the parameters:

- Participation in classes (30%)
- Individual presentation (case study: topic chosen by student within the subjects under study) (30%)
- Individual Test (40%)

### Recommended bibliography:

- Frank P. Lees, Loss Prevention in Process Industries Hazard Identification and control (3 Volumes) 2<sup>a</sup>Ed, 2001. Butterworth Heinmann.
- Roger L. Brauer Safety and Health for Engineers, 2<sup>o</sup> Ed, 2006 John Wiley & Sons, Inc.
- D.A. Crowl, J.F. Louvar, Chemical Process Safety, 2<sup>a</sup> Ed., Prentice Hall International Series in the Physical and Chemical Engineering Sciences, 2002
- P.A. Carson & C.J. Mumford, The Safe Handling of Chemicals in Industry, Vol. 3, Longman Group Ltd. 1996
- Quality Management for Chemical Safety Testing, International Programme on Chemical Safety, World Health Organization, Geneva, 1992
- R. Friedman, Principles of Fire Protection Chemistry, National Fire Protection Association, MA, EUA, 1989
- T. Klets, Still Going Wrong, Elsevier, USA, 2003
- R.E. Sanders, Chemical process Safety, Butterworth-Heinemann, USA, 1999
- R. Macedo, Manual de Higiene do Trabalho na Indústria, Fundação Calouste Gulbenkian, 1988