



PROGRAMS AND BIBLIOGRAPHY

Subject	
Code	Name
QG362	Chemistry with safety

Vector

OF:S-1 T:001 P:000 L:000 O:001 D:001 HS:002 SL:001 C:002 AV:C EX:N FM:75%

Pre requirement

None

Summary

Safety in chemical laboratory. Identification and use of safety equipments. Safety handling of chemical substances. Storage and waste disposal in laboratories. Chemical contamination. Training for emergency attendance. First aid techniques. Work safety legislation.

Program

1. Safety in chemical laboratory
 - 1.1. Usage of safety equipment
 - 1.2. Safety signs
 - 1.2.1. Meaning of colors
 - 1.2.2. Meaning of codes
 - 1.2.3. Meaning of symbols
 2. Usage of specialized safety manuals
 - 2.1. Sigma Aldrich Safety Data Book
 - 2.2. NFPA 704 (Standard System for the Identification of the Hazards of Materials for Emergency Response)
 - 2.3. MSDS (Material Safety Data Book)
 3. Chemistry of fire
Fire triangle: heat, oxygen, fuel
 - 3.1. Fire propagation
 - 3.2. Firefighting
 4. Safety storage and waste disposal in chemical laboratories
 - 4.1. Incompatibilities
 - 4.2. Decomposition products
 - 4.3. Schemes to storage substances. NaCN
 5. Chemical contamination
 - 5.1. Health and environmental impacts of solvents, heavy metals, gases, radioactive products, etc.
 - 5.2. Types of contamination (by skin, ingestion, inhalation, etc.)
 - 5.3. Degree of contamination
 6. Chemist's responsibility towards the workplace and the environment
 - 6.1. Methods of pollutant monitoring

- 6.2. Working with safety
- 7. How to act in emergency situations
 - 7.1. Emergency evaluation
 - 7.2. First aid techniques
- 8. Radioisotopes, Agents and norms
- 9. Analysis of organic and inorganic compounds in the human organism
 - 9.1. Exposure limits
 - 9.2. Degrees of contamination
 - 9.3. Mutations
- 10. Work accidents. Work safety legislation
 - 10.1. Transport and conditioning of chemical products
 - 10.2. Brazilian Constitution
 - 10.3. World health organization

Bibliography

1. Jardim, W. F.; Gerenciamento de resíduos químicos em laboratórios de ensino e pesquisa. *Química Nova* 1998, 21(5), 671-673.
2. Prudent Practices for Disposal of chemicals from Laboratories, Committee of Hazardous Substances in the Laboratory, National Academy Press, Washington, D.C., 1983.
3. Armour, M. A.; Hazardous Laboratory Chemicals Disposal Guide, CRC Press, Boca Raton, FL, USA, 1991.
4. Lenga, R. E. (ed.); The Sigma-Aldrich Library of Chemical Safety Data, Vol. 1 e 2, Milwaukee: Sigma-Aldrich, 1985.
5. Lunn, G.; Sansone, E. B.; Destruction of Hazardous Chemicals in the Laboratory, John Wiley & Sons, New York, 1990.
6. Furr, A. K. (ed.); CRC Handbook of Laboratory Safety, CRC Press, Boca Raton, FL, USA, 2000.
7. Bretherick, L. (ed.); Hazards in Chemical Laboratory, RSC, London, 1986.
8. Pitt, M. J.; Pitt, E.; Handbook of Laboratory Waste Disposal, John Wiley & Sons, New York, 1985.

Websites

1. Comissão de Segurança e Ética Ambiental: <http://www.iqm.unicamp.br/csea/>
2. Gerenciamento de Resíduos: <http://lqa.iqm.unicamp.br>
3. CETESB – <http://www.cetesb.sp.gov.br/>
4. CONAMA – <http://www.mma.gov.br/port/conama/>
5. Centre for Disease Control & Prevention (National Institute for Occupational Safety and Health): <http://www.cdc.gov/niosh>
6. Toxicology Data Network: <http://toxnet.nlm.nih.gov/>

Evaluation criteria

For grading policy, see: Regimento Geral de Graduação, Seção I – Normas Gerais, Capítulo V – Da Avaliação do Aluno na Disciplina. Students are required to attend 75 % of the lectures. For further details, see: Regimento Geral de Graduação, capítulo VI, seção X, artigo 72.