



ENQ410046 - Materials and Sustainability

1. Introduction to sustainability: Definition of sustainable development and its fundamental pillars. Tools to support the definition of sustainable actions in the exploration, use and recycling of resources. Application in the development of new products. Embodied energy and consumption upon using and recycling. 2. Energy: Generation, accumulation and consumption. Challenges of future growing demands and expected impacts. Sustainability of new (green) forms of energy generation and interconnection with availability of materials. Case studies. 3. Materials: Available resources and prospects for future growing demand. Definition of critical materials and supply chain risks. Implications for the development of new technologies (e.g. power generation). Circular economy in the use of materials: design of products, improvement of properties / durability and end of life options. Case studies. 4. Eco-selection of materials / products. Introduction to Life Cycle Analysis. Case studies. 5. Wastes recycling: case studies.

Bibliografia:

- M.F. Ashby, D.F. Ballas, J.S. Coral, Materials and sustainable development, Elsevier, 2015.
- H.F. Lund, McGraw-Hill recycling handbook, McGraw-Hill, 2001.
- L. Smith, J. Means, E. Barth, Recycling and reuse of industrial wastes, Battelle Press, 1995.
- B. Bilitewski, G. Hardtle, K. Marek, A. Weissbach, H. Boeddicker, Waste management, Springer, 1997.