Circular economy

ECTS credits
4 credits

In brief

Course langage: French

Presentation

Learning objectives

The EU is based on sustainable chemistry (technological tools) and environmental management (managerial tools), it provides the tools of eco-design, the whole allowing to transform waste into new resources, and beyond to build industrial ecology. This is really the current trend in the economy.
This UE involves transversal skills in the training of the ECM engineer. The different disciplines involved are process engineering, industrial engineering and chemistry, as well as life cycle assessment (LCA) methods which have developed a lot in the last few years. The main objective is to understand the environmental, societal and economic issues related to industries that transform resources into products.

Description of the programme

- Discover the "carbon footprint" tool of the ADEME, a tool to evaluate the greenhouse gas emissions of a company or a site and also, a tool to help define a strategy in terms of energy management in order to make savings in energy expenses.
- To know the multi-criteria, multi-step structure of an eco-design approach (according to the French standard of the same name) and the difficult constraints that taking the environment into account adds to the usual technical-economic design.
- Discover the ASIT method which is an applied and affordable extraction developed more recently by Roni Horowitz from the TRIZ principles.
- Know the standardized evaluation method "Life Cycle Assessment" of the impacts of an industrial system on the environment.
- Moving from a resource-product-waste transformation chain to processes in which waste constitutes new resources is one of the major challenges of the transformation industry in the 21st century.
- In the valorization section, a global approach to the transformation processes of the material allows to understand the integration of the channels and brings elements of choice of the various modes of recycling or valorization of the effluents or waste. Industrial examples of waste recovery open perspectives of sustainable chemistry and industrial ecology.

Generic central skills and knowledge targeted in the discipline

- C1 : Scientific and technical innovation
In connection with the teaching of the other UE of this course S8, to know how to make a diagnosis in order to then propose manufacturing processes or recovery/treatment of waste allowing to establish a more virtuous cycle going in the direction of the circular economy (C1)
- C2 : Mastery of complexity and systems :
- Master the methods for assessing the environmental impact of a manufacturing or design process or chain (C2)
- Know how to interpret the results of such analyses and identify the steps or processes likely to lead to significant improvements (C2)
- Be able to model and analyze a manufacturing or design process or line (C2)

How knowledge is tested

Ecodesign Continuous control 30
Life cycle analysis Continuous assessment 30
Industrial Symbioses Paired project 40

Bibliography

Numerous articles in the Revue des Techniques de l'Ingénieur

Teaching team

- Jalain (ECM)
- External speakers

Total des heures		**47h**
CM	Master class	19h
TD	Directed work	10h
TP	Practical work	10h
PJ		8h

Useful info

Name responsible for EU

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