

5.0 credits	30.0 h + 30.0 h	2q
-------------	-----------------	----

Teacher(s) :	Proost Joris ;
Language :	Français
Place of the course	Louvain-la-Neuve
Main themes :	The course is divided into three main parts. In the first part, an overview is given of the different metallurgical unit operations, dealing with their thermodynamic, chemical and thermodynamic basis. An intrinsic distinction will be made between pyro- and hydrometallurgical unit operations. Lectures will be supplemented with several practical lab sessions, during which students will apply and decide themselves on the different steps needed for the extraction, refining or recycling of specific metals from a given base material. In a second part, these operations will be used to discuss different industrially applied processes for the extraction and refining of metals, including pig iron, steel and the non-ferrous metals. In a last part, metallurgical and economical aspects of recycling will be discusses.
Aims :	This course aims at applying the basic principles of electrochemistry and chemical thermodynamics and kinetics (as acquired in MAPR 1231) to the description of the physico-chemical principles and technological aspects of metals and semiconductors processing and recycling. At the end of the course, the student should be able to read and understand any metallurgical flow-sheet and to evaluate its technological and economical feasibility. He or she should also be able to propose him- or her-self an operational scheme for the extraction and refining of metals and semiconductors, as well as the recycling of different types of metallurgical and electronic scrap. <i>The contribution of this Teaching Unit to the development and command of the skills and learning outcomes of the programme(s) can be accessed at the end of this sheet, in the section entitled "Programmes/courses offering this Teaching Unit".</i>
Content :	<ol style="list-style-type: none"> 1. Overview of metallurgical unit operations (+ lab sessions) <ul style="list-style-type: none"> - Pyrometallurgical operations and installations - Hydrometallurgical operations and installations 2. Description of metallurgical unit operations (+ exercises) <ul style="list-style-type: none"> - Mass and heat balances - Thermodynamic description - Kinetic description 3. Iron metallurgy <ul style="list-style-type: none"> - Blast furnace processes - Converter processes - Alternative iron-and steelmaking processes 4. Non-ferrous metallurgy (+ plant tour) <ul style="list-style-type: none"> - Copper - Zinc - Lead - Reactive metals (Aluminium, Titanium,) 5. Metals recycling
Other infos :	MAPR 1310 (Thermodynamics - Phase equilibria) or a similar course MAPR 1231 (Applied inorganic chemistry) or a similar course
Cycle and year of study :	> Master [120] in Chemical and Materials Engineering
Faculty or entity in charge:	FYKI