

Erasmus Mundus Joint Master GREENANO

SYLLABUS

Semester 1

COURSE NAME:	Materials Science and Engineering		
HOSTING UNIVERSITY:	University of Lorraine		
SEMESTER:	NUMBER OF ECTS:		PILLAR:
1	9		2
DISTRIBUTION OF HOURS			
Lectures	Seminars	Lab work	Individual student work
80	0	10	30
PROFESSOR:	Alexandre Nominé, Jean François Pierson, Valentin Milichko		
LEARNING AND TEACHING METHODS:	Short courses (1 hour each) + 2 hours of exercise (students work in group to solve the exercises) Lab work with SEM		
PREREQUISITES:	Thermodynamics,		
OBJECTIVES OF THE COURSE:	Be able to describe a materials (structure, composition, microstructure). Acquire the basics to understand the formation of the materials (Thermodynamics and Kinetics)		
CONTENT OF THE COURSE:	Crystallography : Symmetries, reticular systems, Bravais lattices, symetry punctual groups, space groups Thermodynamics : Gibbs Energy curves, chemical potential, phase diagrams Microstructure : Nucleation and growth, growth modes and growth kinetics (nanoparticles, grains, and films), notion of defects Elaboration methods : PVD, MBE, ALD, CVD Characterization methods : Electron microscopies, XRD, Near field etc...		
INTENDED LEARNING OUTCOMES:	The students will have the necessary background to describe a material		
FORM OF ASSESSMENT:	4 exams 1 project		