

MATS9AF MATERIALS FOR OPTRONICS and NANOTECHNOLY

MATS9AF	Duration : 21 hours	ECTS Credits : 2	Semester : S9	
Materials for optronics and nanotechnology				
Person(s) in charge: Bertrand LENOIR, Professor, bertrand.lenoir@mines-nancy.univ-lorraine.fr				
Keywords: Optics and optronics properties of materials				
Prerequisites: Electric and thermal properties of materials, crystallography				
Objective Introduce the different classes of materials which are involved major developments in the field of modern optics and optronics and to understand the basic principles of the associated devices.				
Program and Contents: <ul style="list-style-type: none"> Non linear optics (NLO): formalism, applications to optics of the second order, materials for NLO and applications (frequency doublers, parametric oscillators, electro-optics, etc.). Optics and low dimensional systems, Organic electronics: materials, devices (OLED, transistors, solar cells, etc.) and applications, Light in mineral solids: pigments and solar interactions, inorganic pigments (case of TiO₂ and CeO₂), light with transition and rare earth elements, thermochromism and piezochromism, Non conventional glass for high speed optical telecommunication. Doped and undoped chalcogenide glass for laser fibers, optical amplifiers, infrared cameras, etc. Lasers in material science: different classes of lasers, applications, etc. <p>Lectures will be given by guest speakers. A visit to an industrial site is planned and students will be involved in practical work.</p>				
Abilities:				
Levels	Description and operational verbs			
Know	The different approaches developed in class to modulate optics and optronics properties of materials.			
Understand	Main strategies and concepts involved to improve optics and optronics performances of materials.			
Apply	Methods et approaches seen in class on related subjects			
Analyse	Notions seen in class and keep a critical thinking on consequences			
Summarise				
Evaluate	Evaluation on knowledge and understanding of the course. Evaluation on analysis capacity and restitution on one of the theme of the course			
Evaluations:				
<input type="checkbox"/> Written Test	<input checked="" type="checkbox"/> Continuous Control	<input type="checkbox"/> Oral Report	<input type="checkbox"/> Project	<input type="checkbox"/> Written Report