

Specialization
Green Chemistry for Biomass



Teaching unit	classes	vol.h	Credits	Graduation
TU 1 : Tools in green chemistry and processes	Introduction on green and fine chemistry	02:20	4 ECTS	written
	Chemical engineering for a sustainable industry	05:20		
	Heterogeneous catalysis	06:40		
	Biomass : properties and characterization	08:00		Oral
	Case study in green chemistry	10:40		
		26:20:00		
TU 2 : Bioprocess	Enzymatic catalysis	09:20	4 ECTS	report
	Bioreactors	09:20		
	Fermentation practical work	21		
		39:40:00		
TU 3 : Formulation	Formulation methodology	4	4 ECTS	report
	Colloidal state	09:20		
	Polymer applications	01:20		
	Cosmetics applications	4		
	Galenic applications	02:40		
	Formulation laboratory work	7		
		28:20:00		
TU 4 : Conception of Bioproducts	Biorefineries : agro-industrial production chain	02:40	4 ECTS	oral
	Reactions in porous media	4		
	Development of fonctionnal bioproducts	05:20		
	Development of ecomaterials and bioplastics	09:20		
	Ecodesign & products recycling	02:40		
	Ecodesign for cosmetics, flavour, parfumes (2 seminars)	03:20		report
	Laboratory work in Green Chemistry	21		
		49:20:00		
TU5 : Catalysis for alternative energies	Introduction on alternative energies	02:40	4 ECTS	MCQ
	Photovoltaic	4		
	Biopiles	05:20		
	Hydrogen (synthesis, storage and up-grading)	4		
	Biobased energy	8		
	Catalysis for biomass	05:20		
	Catalytic activation and CO ₂ storage	02:40		
		32		
TOTAL		176 h	20 ECTS	
	Experimental Project	170 h	10 ECTS	oral & report
	Internship : 5 to 6 months		30 ECTS	oral & report
		total :	60 ECTS	