

Academic year 2020/2021

LAST NAME		FIRST NAME	
NAME OF THE SENDING INSTITUTION			
SENDING INSTITUTION SUPERVISOR'S NAME AND EMAIL			
ENSCS SUPERVISOR			
PLANNED PERIOD OF THE MOBILITY	FROM		TILL (MONTH/YEAR)

Double degree students will have the same workload as a typical French higher education student. It means you will have to validate 30 ECTS credits per semester.

**You must choose one Area of Study (O). Select all the courses of the Area of Study chosen. Select the languages chosen.**

Teaching Units	Modules	Code	Semester	ECTS	Select your courses by ticking the boxes below	Language <sup>(1)</sup>
<b>Organic chemistry</b>	Heterocyclic chemistry	7.1.1	S7	6		F
	Homogeneous catalysis	7.1.2	S7			F
	Heteroelements chemistry	7.1.3	S7			F
	Applied molecular spectroscopy	7.1.4	S7			F
	Analysis methods (NMR, HPLC, GC-MS) <sup>(2)</sup>	7.1.5	S7			F
<b>Formulation</b>	Formulation physical chemistry	7.2.1	S7	4		F
	Polymers formulation	7.2.2	S7			F
	Design of experiments	7.2.3	S7			F/E
<b>Materials Science</b>	Main classes of materials	7.3.1	S7	5		F
	Mechanical analyses	7.3.2	S7			F
	Analysis of the solids	7.3.3	S7			F
	Analysis methods: (X ray fluorescence, X ray diffraction, SEM/hardness)	7.3.4	S7			F
<b>Sustainable Chemistry</b>	Introduction to green chemistry	7.4.1	S7	5		F
	Industrial catalysis	7.4.2	S7			F
	Heterogeneous catalysis and industrial applications	7.4.3	S7			F
	Life cycle analysis	7.4.4	S7			F
	Eco Design of materials and processes	7.4.5	S7			F
<b>Languages</b>	LV 1 – English	7.5.1	S7	4		
	LV 2 – German	7.5.2	S7			

	LV 2 – Spanish	7.5.3	S7			
	French as a foreign language	7.5.4	S7			
	Optional: 3rd language	7.5.5	S7			
<b>Sustainable development</b>	Sustainable development <sup>(3)</sup>	7.6.1	S7	2		F
	Toxicology	7.6.2	S7			F
	Security <sup>(2)</sup>	7.6.3	S7			F
<b>Job training, Humanities</b>	3P <sup>(4)</sup>	7.7.1	S7	4		F
	Problem solving tools and methodology	7.7.2	S7			F
	Industrial property	7.7.3	S7			F
	Numerical modeling	7.7.4	S7			F
	Literature research <sup>(5)</sup>	7.7.5	S7			F
	Written and oral communication (1st year's internship)	7.7.6	S7			F
<b>Chemical Engineering</b>	Multi component distillation + liquid - liquid extraction	8.1.1	S8	4		F
	Aspen	8.1.2	S8			F
	Homogeneous Reactors	8.1.3	S8			F
	Experimental chemical engineering	8.1.4	S8			F
<b>Polymers</b>	Physico chemistry of polymers	8.2.1	S8	4		F
	Polymers chemistry	8.2.2	S8			F
	Experimental polymers chemistry	8.2.3	S8			F
<b>Languages</b>	LV 1 – English	8.5.1	S8	4		
	LV 2 – German	8.5.2	S8			
	LV 2 – Spanish	8.5.3	S8			
	French as a foreign language	8.5.4	S8			
	Optional: 3rd language	8.5.5	S8			
<b>Job training, Humanities</b>	Sustainable development <sup>(3)</sup>	8.6.1	S8	5		F
	Cost management	8.6.2	S8			F
	Law	8.6.3	S8			F
	Project: "Elaboration of materials or compounds with functional aim" <sup>(4)</sup>	8.6.4	S8			F
<b>Internship</b>	Industrial internship with responsibilities (8 weeks) <sup>(5)</sup>	8.7.1	S8	5		F

(1): F/E: The course can be given in French or in English according to the audience

(2): Practical work "Industrial Chemistry: analysis methods and security"

(3): Personal professional project, seminars, visits of industrial places

(4): Project: "Elaboration of materials or compounds with functional aim"

(5): 5 ECTS validated by the internship supervisor

Area of study	Teaching Units	Modules	Code	Semester	ECTS	Select your courses by ticking the boxes below	Language
<b>Area A : Chemistry, Biomass and Environment</b>	<b>Molecular and macromolecular chemistry</b>	Natural compounds and carbohydrate chemistry	8.3.A.1	S8	4		F/E
		Functional polymers	8.3.A.2	S8			F
		Natural macromolecules	8.3.A.3	S8			F
		Organic matter valorisation	8.3.A.4	S8			F
	<b>Processes and bioprocesses</b>	Recycling and treatment of industrial waste	8.4.A.1	S8	4		F
		Heterogeneous reactors	8.4.A.2	S8			F
		Introduction to microbiology	8.4.A.3	S8			F
		Enzymatic catalysis	8.4.A.4	S8			F
		Principle and Concept of Biorefineries – Catalytic Transformation	8.4.A.5	S8			F
	<b>Area B : Chemical specialties and Formulation</b>	<b>Chemical specialties</b>	Chemistry of lipids	8.3.B.1	S8	4	
Carbohydrate chemistry			8.3.B.2	S8			F/E
Eco-design of surfactants			8.3.B.3	S8			F/E
Pigments, dyes and colorimetry			8.3.B.4	S8			F/E
Functional Polymers			8.3.B.5	S8			F/E
<b>Formulation design</b>		Solvents and solubility	8.4.B.1	S8	4		F
		Formulation of surfactants and dispersed systems	8.4.B.2	S8			F
		Design of formulated products	8.4.B.3	S8			F
		Seminars (chemical specialties, Formulation)	8.4.B.4	S8			F
		Experimental formulation chemistry	8.4.B.5	S8			F
<b>Area C : Materials</b>	<b>Use properties</b>	Corrosion	8.3.C.1	S8	3		F/E
		Physics of polymeric materials	8.3.C.2	S8			F/E
		Plasticity – Rupture	8.3.C.3	S8			F/E
	<b>Materials</b>	Catalytic materials	8.4.C.1	S8	5		F
		Metallurgy	8.4.C.2	S8			F/E
		Functional materials for energy	8.4.C.3	S8			F/E
		Glass -ceramics	8.4.C.4	S8			F
		Experimental metallurgy	8.4.C.5	S8			F/E

<b>DOUBLE DEGREE STUDENT</b>
Date: .....

<b>SENDING INSTITUTION (We confirm that the proposed programme of study/learning agreement has been approved)</b>	
Date: .....	Date: .....
Supervisor's name and signature	Coordinator's name and signature and <b>Stamp</b>

<b>HOST INSTITUTION (We confirm that the proposed programme of study/learning agreement has been approved)</b>	
Date: .....	Date: .....
ENSCL Supervisor's name and signature	ENSCL Director of Studies - C. DUJARDIN

**IMPORTANT (for students on FITEC programmes) :**

**Kindly note the particularities in the following modules:**

**7.1.4 Applied molecular spectroscopy  
and**

**7.1.5 Analysis methods (NMR, HPLC, GC-MS)**

**The part of the coursework concerning Spectroscopy NMR divided into regular classes (8h) and practical classes (4h 30) is replaced by an intensive preparatory class in Organic Chemistry (9h) in semester 7 at the beginning of the school year.**

**The spectrometry of mass section of module 7.1.4 (8h of courses, 6h of tutorial classes) and 7.1.5 (9h of practical classes) must be taken by double-degree seeking students in semester 7.**

You must choose one Area of Study (O). Select all the courses of the Area of Study chosen. Select the languages chosen.

Area of study	Teaching Units	Modules	Code	Semester	ECTS	Select your courses by ticking the boxes below	Language
Area A : Chemistry and sustainable process for industry	Sustainable resources	Polymers and biosourced composites	9.1.A.1	S9	4	<input type="checkbox"/>	F
		Recycling of polymer materials	9.1.A.2	S9		<input type="checkbox"/>	F
		Bioenergies	9.1.A.3	S9		<input type="checkbox"/>	F
		Rare earths and metals extraction	9.1.A.4	S9		<input type="checkbox"/>	F/E
	Clean processes	Bioprocesses	9.2.A.1	S9	4	<input type="checkbox"/>	F/E
		White biotechnologies	9.2.A.2	S9		<input type="checkbox"/>	F/E
		Reactors engineering - Future Reactors / Clean Technologies	9.2.A.3	S9		<input type="checkbox"/>	F
		Modeling of engineering processes	9.2.A.4	S9		<input type="checkbox"/>	F/E
		Green polymer processes	9.2.A.5	S9		<input type="checkbox"/>	F/E
	Environment	Treatment of gases	9.3.A.1	S9	4	<input type="checkbox"/>	F
		Water treatment	9.3.A.2	S9		<input type="checkbox"/>	F
		Contaminated Soils treatment	9.3.A.3	S9		<input type="checkbox"/>	F
		Analytical techniques associated with the environment	9.3.A.4	S9		<input type="checkbox"/>	F
	Experimental practice	Scientific cross interdisciplinary project	9.4.A.1	S9	3	<input type="checkbox"/>	F
Advanced life cycle analysis.		9.4.A.2	S9	<input type="checkbox"/>		F	
Area B : Formulation Chemistry	Formulation physical chemistry	Colloids (physical-chemistry and industrial applications)	9.1.B.1	S9	5	<input type="checkbox"/>	F
		Surfactants (physical-chemistry and functional properties)	9.1.B.2	S9		<input type="checkbox"/>	F
		Microemulsions (Formulation with the HLD method)	9.1.B.3	S9		<input type="checkbox"/>	F
		Emulsions (formulation, preparing method and characterization)	9.1.B.4	S9		<input type="checkbox"/>	F/E
		Experimental colloidal physico chemistry	9.1.B.5	S9		<input type="checkbox"/>	F
	Strategies in formulation et coatings	Experimental design of mixtures	9.2.B.1	S9	3	<input type="checkbox"/>	F
		Advanced experimental designs and principal component analysis	9.2.B.2	S9		<input type="checkbox"/>	F/E
		Rheological agents	9.2.B.3	S9		<input type="checkbox"/>	F
		Paints and varnishes formulation	9.2.B.4	S9		<input type="checkbox"/>	F/E
		Polymers in formulation - experimentation.	9.2.B.5	S9		<input type="checkbox"/>	F

	<b>Formulation Process</b>	Complex fluids rheology	9.3.B.1	S9	4		F
		Engineering of mixtures	9.3.B.2	S9			F
		Powder technology	9.3.B.3	S9			F
		Conferences (detergents, cosmetics, silicones, sensorial analysis; microfluidics)	9.3.B.4	S9			F
	<b>Transversal project</b>	Advanced experimental formulation chemistry	9.4.B.1	S9	3		F/E
		Scientific transversal project	9.4.B.2	S9			F
<b>Area 3: Optimisation and reliability of materials</b>	<b>Materials' behaviour</b>	Damage and reliability in materials	9.1.C.1	S9	3		F/E
		End-of-life materials	9.1.C.2	S9			F
	<b>The "material solution"</b>	Metallic and multimaterial alloys	9.2.C.1	S9	6		F/E
		Powders technologies and methods for shaping solids	9.2.C.2	S9			F
		Surface treatments	9.2.C.3	S9			F/E
		Glasses	9.2.C.4	S9			F
		Polymers	9.2.C.5	S9			F/E
	<b>Investigation methods</b>	Numerical tools of materials selection	9.3.C.1	S9	3		F/E
		Practical use of finite elements method	9.3.C.2	S9			F/E
		Advanced analysis techniques	9.3.C.3	S9			F
	<b>Project</b>	Scientific cross interdisciplinary project	9.4.C.1	S9	3		F/E

<b>Languages</b>	<b>Languages</b>	LV 1 – English	9.5.1	S9	4		
		LV 2 – German	9.5.2	S9			
		LV 2 – Spanish	9.5.3	S9			
		French as a foreign language	9.5.4	S9			
		Optional: 3rd language	9.5.5	S9			
<b>Entreprise et Management Responsable</b>	<b>Quality, Hygiene and Security</b>	Sustainable development	9.6.1	S9	3		F
		Industrial security	9.6.2	S9			F
		Toxicology	9.6.3	S9			F
		Cross interdisciplinary project in security	9.6.4	S9			F
	<b>Economy, Management</b>	Business simulation project	9.7.1	S9	2		F/E
		Cross interdisciplinary project in economy	9.7.2	S9			F
	<b>Company</b>	Legal environment and company life.	9.8.1	S9	6		F
		Project management	9.8.2	S9			F/E
		Strategic and operational marketing	9.8.3	S9			F
		Production management	9.8.4	S9			F/E

		Management – integration into a company	9.8.5	S9			F
		Written communication (2nd year internship report)	9.8.6	S9			F

<b>Placement</b>		Internship – Final year project (6 months) (*)	10.1.1	S10	30		
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*\* Only the MOOC course is available online in English  
 (\*): 30 ECTS validated by the internship supervisor*

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