

Solar Impulse went all around the world, 40 000km, with no fuel...



This tyre manufactured by Michelin, whose alveolar structure is inspired from corals, cannot be flat since it contains no air. In addition, its tread, reformable by 3D printing, gives it a very long life. Tyres and weight reduce vehicle CO₂ emissions by 15 to 25%.



Cement which removes pollution. Photo-catalytic cement allows to recycle CO₂ emitted by vehicles in a Brussels tunnel.

Environment nowadays



combustion. Cold Innoveox converts all hazardous industrial organic waste (phytopharmaceutical products, pyralenes, etc.) into water by Supercritical Hydrothermal Oxidation.



Recycling wastes from agriculture. The CIMV biorefinery transforms agricultural residues into pulp, wood glue and biofuels.

Positioning:

the engineer's tools to develop a sustainable economy



2 objectives :



Pollutions, Scarcity of resources, Nuisance ...



Show:

Environmental Commitment

- = innovation driver
- = source of profit for companies
- Learn how to develop sustainable solutions, accounting for:
 environnemental problems, as well as societal, regulatory and economic issues

Focused on the circular economy, which opens up the economy of functionality and industrial ecology and eco-design.



The objectives and the issues associated with a sustainable development have been analyzed and classified in a formal way by the United Nations. https://sustainabledevelopment.un.org/

Person in charge of the program: Fal

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ttps://wiki.centrale-marseille.fr/S8Environnement/



ental management



Circular economy



Mesh 2 / Office 104

Monitoring of the environmental quality



The environment





Green chemistry

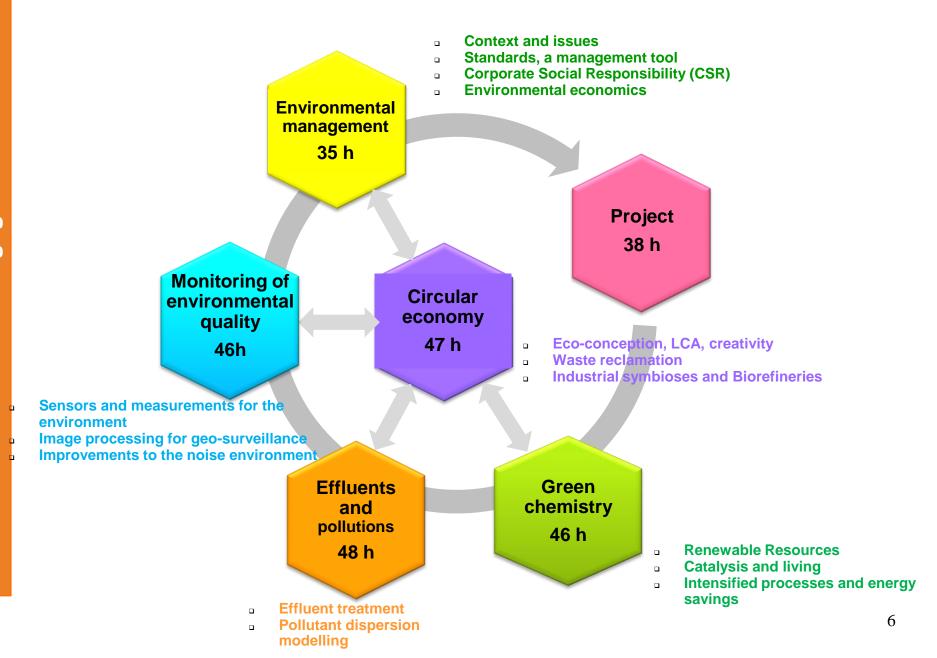
Treatment of effluents and pollutions

S8 Environment at Centrale Marseille: layout

Teaching Units (TU)	Hours	ECTS	Hours					
			Courses, conferences	Exercises, training	Practical work, visits, projects			
Languages - International Culture 4	40	3		40,0				
Environmental management	35	3	29	6				
Circular Economy	47	4	19	10	18			
Effluents and pollutions	48	4	26	16	6			
Green chemistry Monitoring of the environmental	46	4	27,5	10,5	8			
quality	46	4	26	6	14			
Project	38	2			38			
Internship 2 nd year (2A)	-	6		-	-			
TOTAL	300	30	127,5	88,5	84			



Program entirely taught in English



Green chemistry



- Coordinator : Damien Hérault
- Green chemistry concerns the industry of processes for material transformation. This teaching unit (TU) provides the essential bases associated with green chemistry and processes and helps to understand the possibilities of recycling and industrial symbiosis, which are presented in the TU "Circular economy".

Contents:

Towards a biosourced economy ? (J.R. Llinas)	2
Introduction Green chemistry	2
Reach standards (ML. Martos)	2
Agroresources	10
Catalysis	6
Cells, live factories	6
Practical work	8
Intensification and energy savings	8
Biomimetism (H. Bachellier)	2
TOTAL	46 h

Effluents and pollutions

- Coordinator: Nelson Ibaseta
- The TU is concerned with effluent treatment and modelling of effluent diffusion into the environment. It has strong links with the TU "Monitoring" (detection and measurement of pollution) and the TU "Circular economy" (waste reclamation).

Contents:

Treatment of effluents						
Water treatment	18					
Membranes	10					
Phytotechnologies: soils and water (I. Laffont-						
Schwob)						
Diffusion into the environment						
Modelling pollutant dispersion in rivers						
Radionuclid transfers in rivers (P. Boyer)						
Visit (Sewage Treatment Plant, STP, Marseille)						
TOTAL						





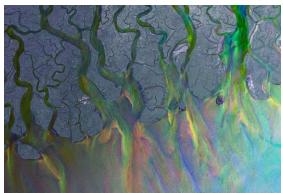
Monitoring of the environmental quality

- Coordinator : Antoine Roueff
- The TU brings together tools for measuring the quality of water, air and noise environments. In connection with environmental management (standards, monitoring of the territory) and clean effluents (modelling of the diffusion and treatment of pollution).



Environmental acoustics						
Acoustic monitoring of CO2 storage areas						
Teledetection						
Sensors						
Sensors for chemistry						
Air quality (Y. Chanac)	2					
Visite of Atmosud air quality monitoring station						
TOTAL	46 h					





Environmental management

- Coordinator : Nicolas Clootens
- Environmental management is part of a sustainable development perspective. It integrates technical, regulatory, behavioural and economic components at company level and positions the role and missions of the engineer. Strongly linked to the TU "Circular economy".
- Contents:

Introduction Concepts, principles and history						
Standards, a real management tool						
Environmental economics						
Conferences:						
Questions about energy						
Eco-citizen energy cooperative						
Safety						
Agriculture and water resources						
management						
TOTAL						
TOTAL						





Circular economy



- Coordinator : Christian Jalain
- The TU relies on "Green chemistry" (technological tools) and "Environmental management" (managerial tools), it provides the tools for eco-design, the whole enabling waste to be transformed into new resources, and beyond that to build industrial ecology. This is really the current trend in the economy.
- Contents:

Introduction	2
LCA et Eco-Conception	
Eco-conception	10
Creativity tools (ASIT)	4
Life Cycle Assessment (SIMAPRO)	8
Project	6
Carbon footprint (ADEME Tool)	10
Industrial ecology	
Industrial ecology	2
Concrete examples of industrial ecology (V. Garbal)	3
Visit (Everé)	2
TOTAL	47 h

Project



- Coordinator : Fabien Anselmet
- Number of hours: 38 h
- Examples of recent subjects :
 - Mosquitoes: study of the toxicity of mosquito bollards (Techno-Beam)
 - Remediation of polluted soils (Novachim)
 - Study of the deposit of plastic and metal industrial packaging (Novachim)
 - Environmental optimization of Waste Edible Oil filtration (Oleo-déclic)
 - Recovery of atmospheric humidity by "fog catcher" nets (UTEC, Lima)
 - Storage and recycling of soil generated during major works (Geosafe)
 - Characterization of an electronic card without physical destruction (Compagnie de France)

Time table and information/documents

 Global time table + info/documents available on Moodle :

https://moodle.centrale-marseille.fr/course/index.php?categoryid=27

 Time table available (with room numbers) every week on Serenade :

https://serenade.centrale-marseille.fr

Ecole Centrale Marselle						ENV CHMOU EP	ENV ECOC	EWEFL	ENV MANAG	ENV SURV	ENV PROJ										2019/2020
	PARCOURS ENV MAJ 28-01-2020 - V10																				
Semainea	6*			ndi				ırdi		Mercredi						udi		Vendredi			
	_	8h - 10h	10h15 - 12h15	13h30 - 15h30 Energie	15h45 - 17h45 ENV MANAG	8h - 10h ENV CHIMOU	10h15 - 12h15	13h30 - 15h30 ENVEGOG	15h45 - 17h45	8h - 10h	10h15 - 12h15	14h00 - 16h00	16h15 - 18h15	8h - 10h ENV MANAG	10h15 - 12h15 ENV MANAG	13h30 - 15h30 Sport	15h45 - 17h45 Sport	8h - 10h ENV MANAG	10h15 - 12h15 ENV MANAG	13h30 - 15h30 ENV MANAG	15h45 - 17h45 ENV MANAG
03 février 07 février			intro	P. DENIS	INTRO	Chimie verte		Economie circulaire-intro			lournée n	artenaires		EN MANAGE	EN III.	Sport	Sport	R			14000
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	_			CM	1530 CM ENV CHMOU ENV EFFL		CM ENVERTL	ENV CHIMDU	ENV SURV	ENV EFFL			см см	СМ	Sport	Occard	3 h CM 9h-12h ENVEFFL ENVEFFL		13k30-16k ENV CHMDU	30 (3h CM)	
10 février			REACH	LVI	LV1	Ressources vertes	treitret wau	Modéliser	Catalyse	Tellidétection	Modéliser			LVI	LV1	Sроп	Sport	Modéliser	Modéliner	Economia bio-sourcés	
14 février	7		M.L. Merton			D. Hersult	N. BASETA	F. Arselmet	D. Nuel	A. Roueff	F. Anselmet							F. Anselmet	F. Accelmet	JR Lines	
			CM ENV CHMDU			CM	ENV CHIMDU	1 CM	1H30 CM	1 CM	2 CM							3 CM ENV CHIMOU	4 TD	CM	ENVEFFL
17 février		Env Ecoc Eco-conception	Catalyne	LV2	LV2	ENV EFFL traitret eau	Resources vertes			ENV SURV Tellidetection	ENV EFFL Modélner			LV2	LV2	Sport	Sport	Catalyse	ENV EFFL Modeliner	ENV EFFL. Tocales	en dylere
21 février	8	Christian Jalain	D. Nuel			N. IBASETA	D. Hersult			A. Roueff	F. Amelmet							D. Hersuit	F. Amelmet	P. BOYER	P. BOYER
		CM	1530 CM			CM	СМ			2 TP	STD							1HSO CM	6 CM	131:30-169	48 (3h CM)
24 février 28 février											Vacano	es hiver									
		ENV ECOC	ENV ECOC			ENV CHIMOU	EW EFFL	ENV MANAG	ENV MANAG	ENV SURV	ENV CHIMDU								ENV SURV	ENV SURV	ENV SURV
02 mars	10		nception	LV3	LV3	Ressources vertes	traitmt eau	Economie	Economie	Telédétection	Catalyse			LV3	LV3		abo 2A ou temps		Telédétection	Telédétection	Telédétection
06 mars		Christia				D. Herault	N. IBASETA	A TOMINI	A TOMNI	A. Roueff	D. Herault					соп	nmun		R. Marion	R. Marion	R. Marion
		ENV ECOC	ENV ECOC			TD ENVEFFL	ENV CHIMDU	13h30-16h ENV MANAG	IS (3h CM) ENV MANAG	S CM ENV SURV	ENV SURV					Sport	Sport	ENV EFFL	4 CM ENV CHIMDU	5 TP ENV SURV	6 TP Pour mémoire :
09 mars		ACV	ACV	LV4	LV4	trattrit eau	Ressources vertes	Economie	Economie	Acoustique	Acoustique			LV4	LV4	Sport	Sport	Modéliser	Procédés verts	Telédétection	challenge sportif à
13 mars			en Jakain			N. IBASETA	D. Hersult	A TOMINI	A. TOMNI	C. MAURY	C. MAURY							F. Anselmet	P. Guichardon	A Rouelf	caser un vendredl
		ENVECOC	ENV ECOC			TD ENV SURV	CM ENV SURV	13h30-16h	45 (3h TD) ENV MANAG	CM ENV PROJ	TD ENVICHMOU					Cood	Coord	1H90 EXAM ENV CHIMOU	CM ENV SURV	7 TP ENV SURV	aprēc midi
16 mars		ENVECOC Ac		LV6	LV6	Acquetque	Accustour Accustour	Economie	Economie	ENV PROJ	eco matiere			LV6	LV6	Sport	Sport	eco matiere	conf Air-PACA	visite Air PACA	
20 mars	12	Christia	en Jakelin			D. MAZZONI	D. MAZZONI	A TOMINI	A TOMNI	Démarrage/présentation	D. Herault							D. Hensult	Y. Channac-Montgreden	Y. Channac	
		TD/s				CM	TD	13h30-16h		des sujets	1 CM							2 TD	CM		
		ENV ECCC CREA	ENV ECOC	LVB	LV8	ENV CHIMDU Ressources vertes	ENV EFFL traitmt wau	ENV MANAG Economie	ENV MANAG Economie	ENV PROJ	ENV PROJ			LV8	LV8	Sport	Sport	ENV MANAG INTRO	ENV CHIMDU Procédés verts	ENV SURV Acoustque	
23 mars 27 mars	13		in Jakain	LVG	LV6	D. Hersuit	N. BASETA	A TOMINI	A TOMNI	1				LVG	LV6	-		J.B. Boyer	P. Guichardon	Y. SOLVI	
		TD / sale info				CM	СМ	13h30-16h										CM	TD	TD	
		ENVECOC ENVECOC ACVProjet LV7			ENV ECOC	ENV ECOC	ENV MANAG ENV MANAG Economie Economie		ENV SURV Tell-diffection	ENV EFFL.			LV7	LV7	Sport	Sport	ENV PROJ	ENV EFFL Membranes	ENV PROJ	ENV PROJ	
30 mars 03 avril	14	ACV Projet Christian Jalain		LV7	LV7		ogie industrielle Economie GARBAL A TOMINI		A. TOMNI	A. Rouelf	P. Guichardon			LV/	LV/	-			P. Guichardon	2	
		TD / sale info				9600-1261	5 (3h CM)	131:30-161-	15 (3h CM)	DAM	1 CM								2CM		
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06 avril 10 avril	16	TP Labo chimie		LV8	LV8	Prolet C. Jelein	N. BASETA	TP Case	crama	N. IBASETA	Membranes P. Guichardon			LV8	LV8	-		Membranes P. Guichardon	J. Bittebierre	S. MEUNIER	
		TP	TP			Projet	2 CM	TP	TP	1 CM	3 CM							4 TD	1 CM	CM	
13 avril	18		Lundi de Páques						Vacances de Pâqu												
17 avril		ENV EFFL	DW DFFL			ENV CHIMDU	ENV PROJ	ENV MANAG	ENV MANAG	ENV PROJ	ENV PROJ							ENVEFFL	ENV SURV	DW DFFL	ENV EFFL
20 avril		TP pil		LV9	LV9	Chimie verte	ENV PROJ	Economie	Agriculture/ressources en es		EW PROJ	Colloque "Blotechnologi	es et Environnement" 77	LV9	LV9	Sport	Sport	Membranes	Capteurs		médiation
24 avril	17	Séance en plus al besoin er	fonction nitre élèves			D. Hersuit	3	A TOMIN	AS. Chlembretto	4								P. Gulchardon	J. Bittebierre	I. Lafont	Schwob
		K, CHANESSIAN TP ENV SURV	TP ENV ECOC			EXAM (8.91)	(evec 2 h du 27 mars)	EXAM	CM ENV SURV		MANAG	ENV SURV	ENV SURV			Sport	Sport	5 TD	2 CM	3 h CM	4h-17h
27 avril		Cepteurs	Projet	LV10	LV10	ENVEFFL TP pile	ENV EFFL ste GP	ENV EFFL N. IBA			é nudésire	Capteurs	Capteurs	LV10	LV10	Sроп	Sport				
01 mai	18	D. NUEL	C. Julein			Séance normale unique si p	eu d'élèves	Valu	STEP		ETIVER	J. Bittebierre	D. NUEL						Ferte - Fét	e du travall	
		1 CM	Projet			K. OHANESSIAN TP	TP			3 h CA	M 9h-12h	3 CM	2 CM								
04 mai		ENV CHIMDU Procédés verts	ENV ECOC Ecologie industriale	LV+	LV+									LV+ LV+		Sport	Sport				
08 mail	19	P. Guichardon	B. Milelri	LVV	244		01	отва		Temps commun				LV+	LVV				Fêriê - Vlotoir		
		TD	CM																		
		ENV ECOC	ENV SURV Surv. Accustique	ENV PROJ	ENV PROJ	ENV PROJ	ENV PROJ	ENVECOC	ENV PROJ	ENV SURV Capteurs	ENV CHIMOU Proofdés verts					Sport	Sport	ENV PROJ	ENV CHIMDU Procédés verts	ENV PROJ	ENV PROJ
11 mai 16 mai	20	Projet C. Jalain	N. Favretto	5		8		Projet C. Jelein		D. NUEL	P. Guicherdon			TOBIC 7		<mark>-</mark>		7 avec 12 mai sp. midi	P. Guichardon	8	
		Projet	CM					Projet		3 TP	TD								TD		
		ENV ECOC	ENV CHIMDU	ENV SURV	ENV ECOC	ENV ECOC	ENV ECOC	ENV ECOC	ENV ECCC												
18 mai 22 mai	21	Restitution projet	Blominétione H. BACHELLIER	Capteurs J. Strabierre	Dian carbone C.A. Lovis	Dian carbone	C.A. Louis	Dian carbone	CA Louis		Rencontres P	ME Gardanne			Férié - A	Ascension			PONT		
		Projet	H. BACHELLIER	TD/ sale info	CM	CM	CM	TD	TD												
		ENV PROJ	ENV PROJ			ENV EFFL	ENV SURV	ENV ECCC	ENV ECCC	ENV PROJ	ENV PROJ					Sport	Sport				
26 mail 29 mail	22	9		secours visite		trater	Capteurs		EVERE (Fox)	10		Question	Centrale ?	Revue-PROJ	Revue-PROJ						
ze mai		,		1		FD PG MM EXAM	DNUB	visite	EVERE (Fos)	10											
Fin S8				•																	

> Any questions ?

> Two representatives are needed (to make the link with me and the other teachers, and for other small duties)