Presenting the S8 Environment 2022-2023

Ecole Centrale Marseille
Semester 8 Program

Environment : Management and Technologies

Organized in 2 parts
February-March and April-May

Fabien Anselmet

February 2023

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

Cement which removes pollution.
Photo-catalytic cement allows to recycle CO_2 emitted by vehicles in a Brussels tunnel.

Environment nowadays

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 CO_2 emissions by 15 to 25%.

Cold combustion. 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

Pollutions,
Scarcity of resources,
Nuisance ...

2 objectives :

- 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/

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

Environmental management

Circular economy

The environment professions

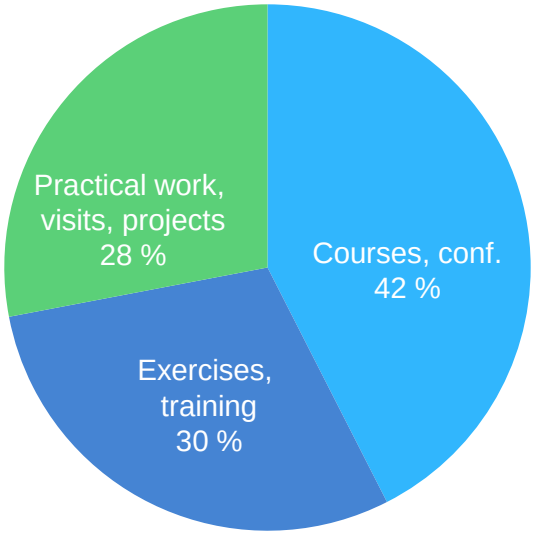
Monitoring of the environmental quality

Treatment of effluents and pollutions

Green chemistry

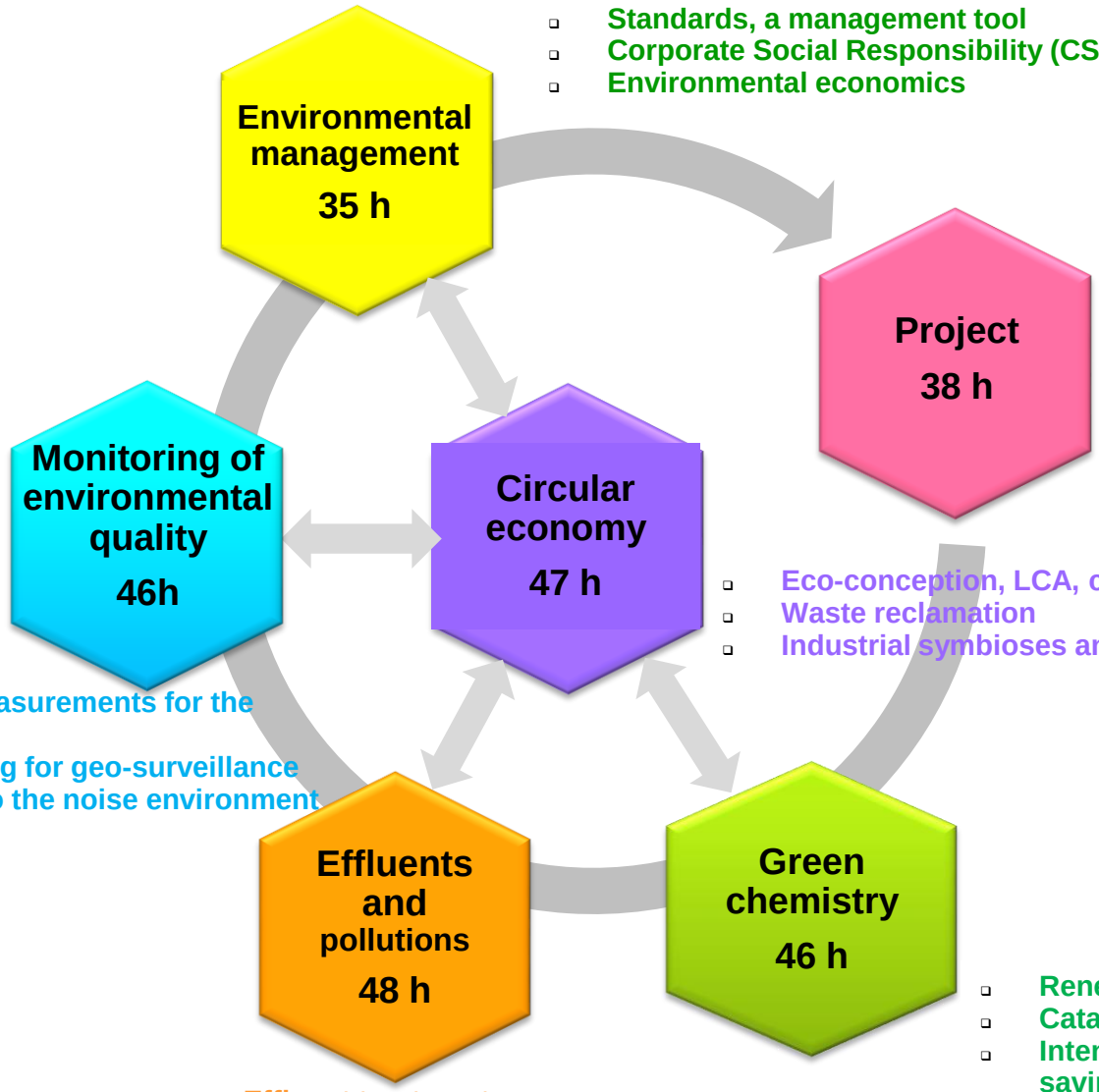
S8 Environment at Centrale Marseille : layout

Teaching Units (TU)	Hours	ECTS	Hours		
			Courses, conferences	Exercises, training	Practical work, visits, projects
Languages - International Culture 4	**40**	**3**		**40,0**	
Effluents and pollutions (semester 1st half)	48	4	26	16	6
Environmental management	35	3	29	6	
Green chemistry	46	4	27,5	10,5	8
Circular Economy (semester 2nd half)	47	4	19	10	18
Monitoring of the environmental Quality	46	4	26	6	14
Project	38	2			38
Internship 2nd year (2A)	**-**	**6**		**-**	**-**
TOTAL	**300**	**30**	**127,5**	**88,5**	**84**



Pedagogical contents

Program entirely taught in English



- Context and issues
- Standards, a management tool
- Corporate Social Responsibility (CSR)
- Environmental economics

- Eco-conception, LCA, creativity
- Waste reclamation
- Industrial symbioses and Biorefineries

- Sensors and measurements for the environment
- Image processing for geo-surveillance
- Improvements to the noise environment

- Effluent treatment
- Pollutant dispersion modelling

- Renewable Resources
- Catalysis and living
- Intensified processes and energy savings

Pedagogical contents

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	3
Diffusion into the environment	
Modelling pollutant dispersion in rivers	12
Radionuclid transfers in rivers (P. Boyer)	3
Visit (Sewage Treatment Plant, STP, Marseille)	2
TOTAL	**48 h**

Pedagogical contents

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	2
Standards, a real management tool	10
Environmental economics	15
Conferences :	8
Questions about energy	
Eco-citizen energy cooperative	
Safety	
Agriculture and water resources management	
TOTAL	**35 h**

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 :

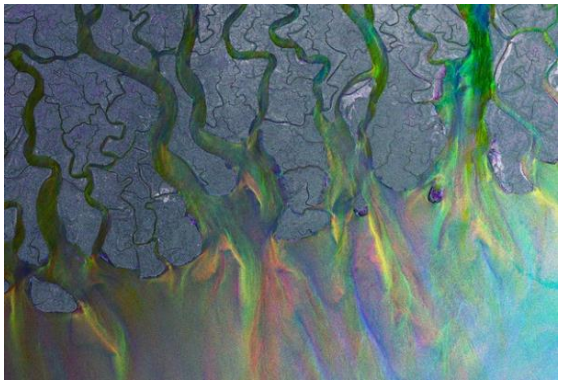
Towards a biosourced economy ? (J.R. Llinas)	2
Introduction Green chemistry	2
Reach standards (M.-L. Martos)	2
Agroresources	10
Catalysis	6
Cells, live factories	6
Practical work	8
Intensification and energy savings	8
Biomimetism (H. Bachellier)	2
TOTAL	**46 h**

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**

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).
- Contents :

Environmental acoustics	12
Acoustic monitoring of CO2 storage areas	2
Teledetection	14
Sensors	8
Sensors for chemistry	6
Air quality (Y. Chanac)	2
Visite of Atmosud air quality monitoring station	2
TOTAL	**46 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/view.php?id=171

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

  https://serenade.centrale-marseille.fr

Ecole Centrale de Marseille

2022/2023

Parcours ENV

MAJ 01/02/2023

Semaines	n°		Lundi				Mardi				Mercredi				Jeudi				Vendredi			
			8h00 - 10h00	10h15 – 12h15	14h00 – 16h00	16h15 – 18h15	8h00 - 10h00	10h15 – 12h15	14h00 – 16h00	16h15 – 18h15	8h00 - 10h00	10h15 – 12h15	14h00 – 16h00	16h15 – 18h15	8h00 - 10h00	10h15 – 12h15	14h00 – 16h00	16h15 – 18h15	8h00 - 10h00	10h15 – 12h15	14h00 – 16h00	16h15 – 18h15
06 février 10 février	6	TEMPS 1		Intro F. ANSELMET	LV1	LV1	ENV CHIMDU Chimie verte D. Nuel 1h00 CM	ENV MANAG INTRO N. Clootens CM	ENV MANAG S. Crandal CM	ENV MANAG S. Crandal CM	Journée Partenaires				LV1	LV1	Sport	Sport	ENV MANAG RSE S. Crandal 3 h CM 9h-12h	ENV MANAG	ENV MANAG ISO 14000 S. Crandal 13h30-19h30 (3h CM)	ENV MANAG
13 février 17 février	7		ENV EFFL Traitmt eau N. IBASETA CM	ENV CHIMDU Ressources vertes D. Herault CM	LV2	LV2	ENV EFFL Traitmt eau N. IBASETA CM	ENV CHIMDU Ressources vertes D. Herault CM	ENV MANAG Economie A. TOMINI 13h30-19h45 (3h CM)	ENV MANAG Economie A. TOMINI	ENV EFFL Traitmt eau N. IBASETA 1 CM	ENV CHIMDU Catalyse 1h30 CM	ENV MANAG Sécurité nucléaire JM METIVIER 3 h CM - OK		LV2	LV2	Sport	Sport	ENV CHIMDU Procédés verts P. Guichardon CM		ENV CHIMDU Catalyse D. Herault 1h30 CM	ENV EFFL Modéliser F. Arsalmet 1 CM
20 février 24février	8		Vacances d'hiver																			
27 février 03 mars	9		ENV CHIMDU Ressources vertes D. Herault CM	ENV CHIMDU Economie bio-sourcée JR Llinas CM	LV3	LV3	ENV EFFL Traitmt eau N. IBASETA CM	ENV CHIMDU REACH F. Perrier CM	ENV MANAG Economie A. TOMINI 13h30-16h45 (3h TD)	ENV MANAG Economie A. TOMINI	ENV CHIMDU Eco matiere D. Herault 2 TD		ENV EFFL Modéliser F. Arsalmet 2 CM	ENV EFFL Modéliser F. Arsalmet 3 TD	LV3	LV3	Sport	Sport	ENV CHIMDU Procédés verts P. Guichardon TD	ENV CHIMDU Eco matiere D. Herault 1 CM	ENV EFFL Phytoremédiation P. Molle 3 h CM 14 h - 17 h - OK	ENV EFFL
06 mars 10 mars	10		ENV CHIMDU TP Labo chimie En rotation avec les TP GP TP	ENV CHIMDU N. Ibaseta / D. Herault TP	LV4	LV4	ENV CHIMDU Ressources vertes D. Herault TD	ENV EFFL Traitmt eau N. IBASETA CM	ENV MANAG Economie A. TOMINI 13h30-19h45 (3h CM)	ENV MANAG Economie A. TOMINI	ENV CHIMDU Bio-procédés A. Sorbi CM	ENV CHIMDU Bio-procédés A. Sorbi CM	ENV EFFL Modéliser F. Arsalmet 4 CM		LV4	LV4	Sport	Sport	ENV CHIMDU Catalyse D. Herault TD	ENV CHIMDU Procédés verts P. Guichardon TD	ENV EFFL Traitmt eau N. IBASETA 2 CM	ENV EFFL Membranes P. Guichardon 1 CM
13 mars 17 mars	11		ENV CHIMDU TP Labo chimie En rotation avec les TP GP TP	ENV CHIMDU N. Ibaseta / D. Herault TP	LV5	LV5	ENV CHIMDU Ressources vertes D. Herault CM	ENV EFFL Traitmt eau N. IBASETA CM	ENV MANAG Economie A. TOMINI 13h30-16h45 (3h TD)	ENV MANAG Economie A. TOMINI	ENV CHIMDU Biomimétisme Y. BRACHET CM	ENV EFFL Membranes P. Guichardon 2 CM	ENV EFFL Modéliser F. Arsalmet 5 CM	ENV EFFL Modéliser F. Arsalmet 6 TD	LV5	LV5	Sport	Sport	ENV EFFL Modéliser F. Arsalmet 1h30 EXAM à 8 h	ENV EFFL Membranes P. Guichardon 3 CM	CCL	
20 mars 24 mars	12		ENV EFFL TP pilote GP En rotation avec TP Chimie TP	ENV EFFL N. Ibaseta / D. Herault TP	LV6	LV6	ENV CHIMDU Catalyse D. Nuel 1h00 CM	ENV EFFL Membranes P. Guichardon 4 TD	ENV MANAG Economie A. TOMINI 13h30-16h45 (3h CM)	ENV MANAG Economie A. TOMINI	ENV CHIMDU Chimie verte D. Herault EXAM (à 9 h)	ENV CHIMDU CM	ENV MANAG Economie A. TOMINI EXAM	ENV MANAG Agriculture/ressources en eau A.-S. Chambretto CM (à confirmer)	LV6	LV6	PME			ENV EFFL Effluents/Traiter N./ PG EXAM	ENV EFFL Transfert en milieu P. BOYER 14 h 00 - 17 h 00 (3h CM) - OK	ENV EFFL P. BOYER	
27 mars 31 mars	13		Semaine Training																			
03 avril 07 avril	14	TEMPS 2	ENV PROJ 1 h - F. Arsalmet Démarrage/présentation des sujets à 8 h	ENV ECOC Economie circulaire N. Clootens CM	LV7	LV7	ENV PROJ 1	ENV ECOC Eco-conception Christian Jalain CM	ENV SURV Capteurs D. NUEL 1 CM	ENV SURV Capteurs F. Lamarque 1 CM - OK	Visite entreprises				LV7	LV7	Sport	Sport	ENV SURV Acoustique C. MAURY CM	ENV SURV Acoustique C. MAURY TD	ENV SURV Surv. Acoustique N. Fennetto CM - OK	
10 avril 14 avril	16		Férié - Lundi de Pâques				ENV PROJ 2	ENV PROJ	ENV SURV Télédétection B. Puysegur 3 CM	ENV SURV Télédétection B. Puysegur + M. Dlong (?) 4 TP	ENV SURV Télédétection B. Puysegur 1 CM	ENV SURV Télédétection B. Puysegur + M. Dlong (?) 2 TP			LV8	LV8	Sport	Sport	ENV PROJ 1 - bis (avec 2 h du 4 avril)	ENV SURV Acoustique S. YSTAD CM - OK	ENV PROJ 3	ENV PROJ
17 avril 21 avril	18		ENV ECOC Eco-conception Christian Jalain CM	ENV ECOC CM	LV8	LV8	ENV ECOC ACV Christian Jalain CM	ENV ECOC CM	ENV SURV Acoustique S. MEUNIER CM - OK	ENV PROJ 4 debut	ENV SURV Acoustique D. MAZZONI TD/Salle Info	ENV SURV Acoustique D. MAZZONI TD/Salle Info			LV9	LV9	Sport	Sport	ENV PROJ 4 fin	ENV SURV conf Air-PACA Y. Chennac CM	ENV SURV Visite Air PACA Y. Chennac	
24 avril 28 avril	17		Vacances de printemps																			
01 mai 05 mai	18		1er mai				ENV ECOC ACV Christian Jalain TD / salle info	ENV ECOC	ENV SURV Capteurs D. NUEL 2 CM	ENV PROJ 5	ENV PROJ				LV10	LV10	Sport	Sport	ENV SURV Télédétection R. Marion 5 CM (3 h)	ENV SURV Télédétection R. Marion - TP Demi promo	ENV SURV Télédétection R. Marion - TP Demi promo	
08 mai 12 mai	19		08-mai				ENV ECOC CREA Projet Christian Jalain TD / salle info	ENV ECOC	ENV SURV Capteurs D. NUEL 3 TP	ENV SURV Capteurs F. Lamarque 2 CM	ENV PROJ 6	ENV PROJ			LV+	LV+	Sport	Sport	ENV PROJ 7	ENV SURV Télédétection R. Marion - TP Demi promo	ENV SURV Télédétection R. Marion - TP Demi promo	
15 mai 19 mai	20		ENV ECOC ACV Christian Jalain CM	ENV ECOC CM	LV9	LV9	ENV ECOC Projet C. Jalain Projet	ENV ECOC Projet C. Jalain Projet		ENV SURV Capteurs F. Lamarque 3 CM	ENV PROJ 8	ENV PROJ			Férié - Jeudi de l'Ascension				Pont			
22 mai 26 mai	21		ENV ECOC Projet C. Jalain Projet	ENV ECOC Projet C. Jalain Projet	LV10	LV10		ENV ECOC bilan carbone S. Toreguzzo CM	ENV ECOC bilan carbone S. Toreguzzo CM	ENV ECOC bilan carbone S. Toreguzzo CM	ENV ECOC bilan carbone S. Toreguzzo TD	ENV ECOC bilan carbone S. Toreguzzo TD			LV+	LV+	Sport	Sport	ENV PROJ 9	ENV PROJ	ENV PROJ 10	ENV PROJ
29 mai 02 juin	22		Lundi de pentecôte				ENV ECOC Restitution projet C. Jalain Projet	ENV SURV Capteurs F. Lamarque TD / salle info	Revue-PROJ	Revue-PROJ	ENV SURV Capteurs DNFL Exposés	ENV SURV Capteurs DNFL Exposés			TOEIC		Sport	Sport				

Fin S8

- **Any questions ?**

- **Two representatives are needed**

(to make the link with me and the other teachers, and for other small duties)