POLYTECH
ANNECY-CHAMBÉRY

Curriculum of the program in Industrial Ecology

UNIVERSITÉ
SAVOIE
MONT BLANC

Curriculum of the program in Industrial Ecology

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Glossary

Program

EIT	Industrial Ecology

Course codes

CHIM	Chimistry
EASI	Electrical engineering and signal processing
ENER	Energy
GECH	Civil engineering
GEDP	Process engineering
INFO	Computer science
LANG	Foreign languages
MATE	Materials
MATH	Mathematics
MECA	Mechanical engineering
PHYS	Physics
PROJ	Projects and internships
SHES	Humanities and social sciences

General terms

CC	Continuous examination
ET	Final examination
TC	Common course
TD	Exercices
TP	Labs
UE	Program unit

Semester 5

UE	ECTS	Module	Course name	Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
UE501 : Professionnal Environment	6	LANG500	Tutoring in English		12			
		LANG501	English		40.5		4	CCI (écrit et oral)
		SHES501	Sport		21		1	CC/pratique
		SHES505	Business Game		19.5		1	CC (écrit et oral)
UE502 : Engineering Sciences and Tools	12	DDRS501	Sustainable Development	12	9		1.5	CC(45%) + Projets (55%)
		EASI501	Electrical Engineering	13.5	15	12	3	CC(70%) TP(30%)
		INFO501	Number representation and algorithm design	12	10.5	16	3	CC(70%) + TP(30%)
		INFO502	Data base	6	4.5	12	1.5	CC
		MATH500	Mathematics refresher course		21			
		MATH501	Mathematics	21	19.5		3	CC
UE503 : Flows and Balances at Territorial Level	12	GEDP521	Balance sheets: Matter and Energy	12	28.5		3	CC
		PROJ521	Project base learning: Innovation and Creativity			24	1	CC
		PROJ522	Problem-based learning : Management and Collecting Waste	12	12	3	3	CC
		SCVT521	Databases and modelling tools - Bibliographic research	15	15	16.5	3	CC
		SHES521	Territorial Organization	12	15		2	CC

1. UE501 : Professionnal Environment

1.1. LANG500 - Tutoring in English

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
	12			

Language(s) for the course

- English

Descriptif

1.2. LANG501 - English

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
	40.5		4	CCI (écrit et oral)

Language(s) for the course

- English

Descriptif

This course aims at training our engineering students to obtain a minimum score of 785/990 in the TOEIC test (« Test of English for International Communication ») as required by the CTI (the accredited French National Institution supervising the award of engineering degrees. Our students are also trained to improve in all four language skills (listening, reading, writing and speaking) on a variety of (everyday life and professional) topics via the news, videos, oral presentations, mock interviews, debates, writing assignments, etc...

The students are evaluated through continuous assessment.

1.3. SHES501 - Sport

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
	21		1	CC/pratique

Language(s) for the course

- French

Descriptif

This course is based on the practice of physical and sports activities and has two axes.

On the one hand, it allows the students to acquire know-how for the sports activities and to put forward their social skills, qualities required for their insertion and their professional success. This axis is based on the values conveyed by the various sports activities and their diversified modes of practice.

On the other hand, it allows the students to acquire collective skills in the realization of a project and the management of a group and also to develop their individual capacities of adaptation and regulation. This axis examines the collective organization and the implementation of a sports event on a session.

1.4. SHES505 - Business Game

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
	19.5		1	CC (écrit et oral)

Language(s) for the course

- French

Descriptif

Business Games (or serious games) aim to simulate management process and are used to train and develop knowledge and skills in areas such as strategic thinking, leadership, teamwork management, financial analysis, market analysis and operations management. Like a business, games should involve people, resources and processes. The aim is to give participants an experience comparable to one in 'real-life'. A business has also to remain competitive, so business games are usually competitive in character with compressed time periods, allowing the result of decisions and policies to be seen.

2. UE502 : Engineering Sciences and Tools

2.1. DDRS501 - Sustainable Development

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
12	9		1.5	CC(45%) + Projets (55%)

Descriptif

This course aims to educate engineering students to the issue of sustainable development and its integration in enterprises' policy and enable them to take control of this aspect in their professional life.

2.2. EASI501 - Electrical Engineering

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
13.5	15	12	3	CC(70%) TP(30%)

Language(s) for the course

- French

Descriptif

Basics of electrical engineering, transient operations, direct and alternative currents.

2.3. INFO501 - Number representation and algorithm design

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
12	10.5	16	3	CC(70%) + TP(30%)

Language(s) for the course

- French
- French with documents in english

Descriptif

This course aims on the one hand to acquire the basic knowledge on the representation of information in computers and on the other hand to acquire the basics of algorithmics and programming with an introduction to the use of an object language.

2.4. INFO502 - Data base

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
6	4.5	12	1.5	CC

Language(s) for the course

- French

Descriptif

This course introduces some of the key features of relational databases. The practical classes will be applied to both general and professional issues :

- UML Entity Relationship Diagram (ERD)
- Relational Model (RM) and algebra
- SQL

2.5. MATH500 - Mathematics refresher course

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
	21			

Descriptif

This course aims to reinforce the bases in mathematics .

2.6. MATH501 - Mathematics

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
21	19.5		3	CC

Descriptif

This course aims to give the basic concepts in analysis useful for engineering sciences

3. UE503 : Flows and Balances at Territorial Level

3.1. GEDP521 - Balance sheets: Matter and Energy

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
12	28.5		3	CC

Language(s) for the course

- French

Descriptif

This course aims to propose a methodology to establish a macroscopic balance of mass and/or energy of a system, involving mass and energy transfers.

3.2. PROJ521 - Project base learning: Innovation and Creativity

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
		24	1	CC

Language(s) for the course

- French

Descriptif

Integration and immersion of students in the EIT training through a challenge. Discovery and experimentation of techniques, tools and methods of creativity to meet a challenge on industrial and territorial ecology.

3.3. PROJ522 - Problem-based learning : Management and Collecting Waste

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
12	12	3	3	CC

Language(s) for the course

- French

Descriptif

This is to address the issue of territorial management through the example of the collection of waste at the scale of a department, Savoie.

In particular, engineering students will go towards carrying out the Bilan Carbone of household waste transport up to the waste energy recovery unit in Chambéry-Bissy.

3.4. SCVT521 - Databases and modelling tools - Bibliographic research

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
15	15	16.5	3	CC

Descriptif

Cartography, notions of city and land planning

This course proposes to observe in the field and on maps the way the territory is laid out. It brings some theoretical elements relating to cartography, urbanism and planning, but it mainly confronts the students in concrete cases to understand the main principles, the main actors and the problems of the spatial planning with different scales. It is articulated with the module "Territorial organization".

Initiation to Geomatics

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This part of the course is an introduction to Geographic Information Systems (GIS) and their exploitation by QGIS software. After a general presentation of GIS, simple exercises are proposed to explore and analyze geographic data and their relationships.Bibliographic search :

to know the useful resources for each discipline as complete as possible

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- know how to mobilize all the tools of a bibliographic search with efficiency,

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- to acquire useful know-how at each stage of the writing of a research work. The skills targeted for this objective are to use a software of management of bibliographical references (Zotero) and to know how to quote while avoiding the pitfall of the plagiarism.

3.5. SHES521 - Territorial Organization

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
12	15		2	CC

Descriptif

The objectifve of this course is to understand the hierarchy of levels of decisions and responsibiliies, from Europe to the commune. In particular, for waste water, energy, household and industrial waste collection and management and treatment.

Semester 6

UE	ECTS	Module	Course name	Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
UE601 : Professionnal Environment	6	LANG600	Tutoring in English		12			
		LANG601	English		40.5		4	CC
		PROJ601	Internship Discovery of the Professional Environment					Quitus diplôme
		SHES601	Introduction to Accounting and Corporate Finance	10.5	9		1	Oral
		SHES602	Introduction to Law	15	4.5		1	CT
UE602 : Natural Ressources : Exploitation and Interactions	9	DDRS621	Sustainable Development	12	30		3	CC
		ENER621	Natural ressources: Energy and Matter	22.5	9		3	CC
		SCVT621	Biogeochemical cycles and natural ressources	21	15.5	19	3	CC
UE603 : Transfer Projects	15	PROJ621	Problem-based learning: Thermodynamics : Energetic flux	10.5	32	24	5	CC
		PROJ622	Problem-based learning: Fluid Mechanics - Open-channel flows	12	21	20	5	CC
		PROJ623	Problem-based learning: Heat Transfer - Dimensioning of the heat exchanger	27	38		5	CC

1. UE601 : Professionnal Environment

1.1. LANG600 - Tutoring in English

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
	12			

Language(s) for the course

- English

Descriptif

1.2. LANG601 - English

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
	40.5		4	CC

Language(s) for the course

- English

Descriptif

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The students are evaluated through continuous assessment.

1.3. PROJ601 - Internship Discovery of the Professional Environment

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
				Quitus diplôme

Descriptif

Discovery of the professional environment

1.4. SHES601 - Introduction to Accounting and Corporate Finance

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
10.5	9		1	Oral

Language(s) for the course

- French

Descriptif

The objective of this course is to acquire the basics of financial management.

1.5. SHES602 - Introduction to Law

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
15	4.5		1	CT

Language(s) for the course

- French

Descriptif

The objective of this course is to obtain a basic understanding of law

2. UE602 : Natural Ressources : Exploitation and Interactions

2.1. DDRS621 - Sustainable Development

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
12	30		3	CC

Language(s) for the course

- French

Descriptif

3 parts :

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-deepening of the Carbon foorprint (Bilan Carbone) method (communities, multisite, multiannual comparator ...) with report writing and data extraction according to the different international protocols (GES, GHG Protocol, ISO 14069).

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- economic approach to sustainable development, in particular the social and solidarity economy (ESS)

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- Learning Life Cycle Analysis

2.2. ENER621 - Natural ressources: Energy and Matter

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
22.5	9		3	CC

Language(s) for the course

- French

Descriptif

This course aims to identify the different natural, renewable and recoverable resources (energy and matter) available at local, national and international scales.

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The notions of accessibility to the resource (stock / flux resources, stock, variability, quality, potential use, market pressure) and their evolution / exhaustion will be discussed for the main exploitable resources:

- Fossil sources: gas, oil, coal;
- Renewable sources: solar, wind, geothermal, outdoor air, wood energy and timber;
- Water resources (surface: potential and kinetic energies, aquifers, rain, marine energy);
- Noble materials (metals, rare earths ...).

2.3. SCVT621 - Biogeochemical cycles and natural ressources

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
21	15.5	19	3	CC

Language(s) for the course

- French

Descriptif

Hydrogeology - bio geochemical cycles (water, carbon, nitrogen, phosphorus).

3. UE603 : Transfer Projects

3.1. PROJ621 - Problem-based learning: Thermodynamics : Energetic flux

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
10.5	32	24	5	CC

Language(s) for the course

- French

Descriptif

Thermodynamics (CM: 10h, TD: 30h)

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This teaching aims to acquire:

- the basics of thermodynamics: study of open and closed systems involving exchanges of work, heat and energy in general, based on concrete applications encountered in engineering.
- understand the operation of ditherm systems for the conversion of thermal energy into work (or vice versa)

This module will be delivered in the form of Problem Based Learning, in conjunction with the PROJ622 and PROJ623 modules.

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Practical work (TP: 24h)

- Measurement of thermal properties of materials
- Coupled heat transfers
- Heat exchangers
- Tube exchangers
- Heat Pump

3.2. PROJ622 - Problem-based learning: Fluid Mechanics - Open-channel flows

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
12	21	20	5	CC

Language(s) for the course

- French

Descriptif

This module covers hydraulics and non compressible fluid dynamic.

It first presents the equations of hydraudynamics and applies them to the analysis and design of hydraulic circuits.

It then deals with local equations of fluid mechanics and dimensional analysis.

The knowledge are implemented on a transversal project common to the modules PROJ 621 (thermodynamics) PROJ 622 (fluid mechanics) and PROJ 622 (heat transfers)

Practical work illustrates the knowledge

3.3. PROJ623 - Problem-based learning: Heat Transfer - Dimensioning of the heat exchanger

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
27	38		5	CC

Language(s) for the course

- French

Descriptif

This module covers the 3 heat transfer modes: conduction, convection and radiation.

It addresses the physics of phenomena, its modeling through local equations, as well as the main correlations allowing to evaluate heat transfers in engineering problems.

The different heat exchanger technologies are presented. The main methods for designing them and describing their performances are presented and implemented.

Semester 7

UE	ECTS	Module	Course name	Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
UE701 : Professionnal Environment	6	LANG700	Tutoring in English		6			
		LANG701	English (below B2 level)		40.5		3	CC
		LANG702	Foreign languages (B2 level)		35		3	CC
		SHES703	Professional resources and dynamics		15	4	1.5	Oral (50%) + rapport et soutenance stage 3A (50%)
		SHES704	Creativity and innovation management		25.5		1.5	CCI : 50% (rapport/QCM) et 50% (soutenance)
UE702 : Energy and gaz treatment	12	ENER721	Energy Carriers, Energy and Quality Conversion	33	33	12	6	CC(80%) + TP(20%)
		GEDP722	Air Pollution: Issues and Filtration processes	30	24	36	6	CC(70%) TP(30%)
UE703 : Industrial and Territorial Ecology	12	PROJ721	Problem-based learning: Territorial and Industrial Ecology	36	21	5	7	CC
		PROJ722	Multi-criteria analysis, decision-aiding tool	9	12		2	CC
		SHES721	Production managment and Quality and Workflow	12	18		3	CC

1. UE701 : Professionnal Environment

1.1. LANG700 - Tutoring in English

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
	6			

Descriptif

1.2. LANG701 - English (below B2 level)

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
	40.5		3	CC

Language(s) for the course

- English

Descriptif

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Our students are also trained to improve in all four language skills (listening, reading, writing and speaking) on a variety of (everyday life and professional) topics via the news, videos, oral presentations, mock interviews, debates, writing assignments, etc...

The students are evaluated through continuous assessment.

1.3. LANG702 - Foreign languages (B2 level)

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
	35		3	CC

Descriptif

A 15-hour course in English: Culture, civilisation and language.

And a 20-hour course in a second foreign language in:

- Spanish, German et Italian at Chambéry and Annecy (no beginners).
- Chinese et Japanese at Annecy (beginners accepted)

1.4. SHES703 - Professional resources and dynamics

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
	15	4	1.5	Oral (50%) + rapport et soutenance stage 3A (50%)

Language(s) for the course

- French

Descriptif

The objective of the module is to lead the students towards a better self-knowledge in order for them to be able to define a professional project, develop a targeted research strategy and present themselves effectively in an interview.

1.5. SHES704 - Creativity and innovation management

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
	25.5		1.5	CCI : 50% (rapport/QCM) et 50% (soutenance)

Language(s) for the course

- French

Descriptif

This module aims to introduce the students to corporate strategy, and thus enable them to be able to understand the current major corporate orientations. The emergence of new competitive practices based on externalization perspectives or cooperation through partnership training in order to share the risks and costs will be studied.

2. UE702 : Energy and gaz treatment

2.1. ENER721 - Energy Carriers, Energy and Quality Conversion

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
33	33	12	6	CC(80%) + TP(20%)

Language(s) for the course

- French

Descriptif

Energy vectors & energy conversion (CM: 36h, TD: 32h)

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This course aims to:

- to distinguish and qualify the different forms of energy (electrical, mechanical, hydraulic, chemical, thermal, radiant ...)
- to understand the possibilities and limitations of energy conversion systems.

Practical work (TP: 18h)

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ThermOptim project

2.2. GEDP722 - Air Pollution: Issues and Filtration processes

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
30	24	36	6	CC(70%) TP(30%)

Language(s) for the course

- French

Descriptif

The aim of this course is to provide the knowledge needed to understand the gaseous and particulate pollutions and the current associated issue. This course also provide the knowledge needed to design and implement a gas/ solid separaton process.

3. UE703 : Industrial and Territorial Ecology

3.1. PROJ721 - Problem-based learning: Territorial and Industrial Ecology

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
36	21	5	7	CC

Language(s) for the course

- French

Descriptif

From the transformations of the economy and society, this course proposes to analyze the territorial dynamics and the games of actors in a systemic logic. It will question how new modes of regulation and new practices appear in a context of ecological awareness of assertion with variable geometry of transition process.

APP: problem related to waste, including energy aspects: waste management.

3.2. PROJ722 - Multi-criteria analysis, decision-aiding tool

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
9	12		2	CC

Language(s) for the course

- French

Descriptif

The course aims to basically introduce the following concepts and notions :

1. The problematic of decision support

2. Construction of a decision-support problem : notion of actions, criteria, preferences

3. Electre kind methods of overclassification

3.3. SHES721 - Production managment and Quality and Workflow

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
12	18		3	CC

Language(s) for the course

- French

Descriptif

The aim of this course consists of the basic knowledge in the area of Operation Management and Quality. The mains subjects dealt with are the inventory management, the MRP and MRPII methods and the ISO 9000 Quality Management System.

Semester 8

UE	ECTS	Module	Course name	Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
UE801 : Professionnal Environment	6	LANG800	Tutoring in English		6			
		LANG801	English (Below B2 Level)		40.5		3	CC
		LANG802	Foreign languages (B2 level)		35		3	CC
		SHES802	Integrated Management System QSE (Quality Safety Environment)	9	10.5		1.5	CC
		SHES803	Organization theory	9	9		1.5	CC
UE802 : Internship	6	PROJ801	Engineering Assistant Internship				6	Évaluation par compétences
UE803 : Process Engineering and Energy	8	ENER821	Optimization of Energy Storage and Transfer	28	32		5	CC
		GEDP821	Reactive systems and bioprocesses	18	30	12	4	CC (80%) TP(20%)
UE804 : Effluent treatments	10	DDRS821	Water Reuse and Health Risks	16.5			1	CC
		GEDP822	Unitary Operations of Effluent Treatment	25.5	25.5		4	CC
		PROJ822	Problem-based learning: Bioreactors and Effluent Treatment		48	39	5	CC

1. UE801 : Professionnal Environment

1.1. LANG800 - Tutoring in English

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
	6			

Language(s) for the course

- English

Descriptif

1.2. LANG801 - English (Below B2 Level)

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
	40.5		3	CC

Language(s) for the course

- French

Descriptif

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The students are evaluated through continuous assessment.

1.3. LANG802 - Foreign languages (B2 level)

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
	35		3	CC

Descriptif

A 15-hour course in English: Culture, civilisation and language.

And a 20-hour course in a second foreign language in:

- Spanish, German et Italian at Chambéry and Annecy (no beginners).
- Chinese and Japanese at Annecy (beginners accepted)

1.4. SHES802 - Integrated Management System QSE (Quality Safety Environment)

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
9	10.5		1.5	CC

Language(s) for the course

- French

Descriptif

The students must be aware that the quality management system, the environmental management system and the occupational health and safety management system are today inescapable in the company. It is thus necessary for them to have sufficient knowledge of these systems to take them into account and integrate them into their engineer's job.

1.5. SHES803 - Organization theory

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
9	9		1.5	CC

Language(s) for the course

- French

Descriptif

The content of this course is deliberatley descriptive and follows a very clear chronology. The programme retraces the beginnnings of organization management from the end of the XIXth century to today. The course thus analyzes the main theories, reasearch and managerial progress made during the development of companies.

This module is divided into three main themes :

- The foundations of organization management (traditional approach and school of human relations);
- The concept of organizational structure using, for example, the works of Mintzberg which highlight the opportunities and constraints in terms of design, coordination and layout of a company;

- Organizational behavior with the notions of performance, diversity, conflict,negotiation, stress...

This is a basic course in the domain of management. Students can obtain a global overview of company management and thus understand the ins and outs.

2. UE802 : Internship

2.1. PROJ801 - Engineering Assistant Internship

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
			6	Évaluation par compétences

Language(s) for the course

- French

Descriptif

The 4th year internship is an application internship in a professional environment such as a technician or assistant engineer. The engineering student will be responsible for a specific study, the development or adaptation of new techniques or methods. This training period will be carried out in a company or organization whose activity is representative of the chosen specialty.

3. UE803 : Process Engineering and Energy

3.1. ENER821 - Optimization of Energy Storage and Transfer

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
28	32		5	CC

Language(s) for the course

- French

Descriptif

This course aims to:

- to offer tools for the optimization of transfers and systems, including storage solutions
- to learn about exergo-economic analysis for the techno-economic optimization of energy systems

3.2. GEDP821 - Reactive systems and bioprocesses

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
18	30	12	4	CC (80%) TP(20%)

Language(s) for the course

- French

Descriptif

The aims of this course:

- to screen the methodologies to identify the kinetics of various chemical reactions in batch reactor,
- to give the fundamental concepts and the methodology from chemical engineering applied and bioprocesses in order to apply these concepts to the field of the gaseous and liquid processes.

4. UE804 : Effluent treatments

4.1. DDRS821 - Water Reuse and Health Risks

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
16.5			1	CC

Descriptif

The objective of this course is to evaluate health risks associated to the reuse of treated wastewater. Examples of reuse of treated effluent (domestic waste water or industrial water) will be presented through conferences or site visits.

4.2. GEDP822 - Unitary Operations of Effluent Treatment

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
25.5	25.5		4	CC

Language(s) for the course

- French

Descriptif

This course aims to :

- understand the steps in wastewater treatment (step-by-step guide): collection systems, treatment processes, sludge treatment and valorization, impacts on the natural environment.
- acquire basic concepts for the design of unit operations conventionally implemented in the wastewater treatment.

4.3. PROJ822 - Problem-based learning: Bioreactors and Effluent Treatment

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
	48	39	5	CC

Language(s) for the course

- French

Descriptif

This course allows to understand, choose and size a whole process of wastewater treatment (residual and industrial effluents) : networks of collection, autonomous purification and collective, pretreatment of industrial waste.

Semester 9

UE	ECTS	Module	Course name	Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
UE901 : Professionnal Environment	10	LANG901	English		40.5		2.5	CC
		LANG902	Foreing Language (above TOEIC Level)		35		2.5	CC
		PROJ901	R and D Project			40	6	Pratique + Rapport + Soutenance
		SHES901	Management	15	7.5		1.5	CC
UE902 : Process Engineering and Energy	10	ENER921	Energy Processes	38	37	28	8	CC
		GEDP921	Treatment of gas contamination	20	20	8	4	CC
UE903 : Promoting renewable energy	10	ENER922	Networks and Storage	16	20		3	CC
		PROJ921	Problem-based learning: Organic Waste and Energy	20	44	8	4	CC
		SHES921	Energy and Environmental Laws, Public Market	24	16		3	CC

1. UE901 : Professionnal Environment

1.1. LANG901 - English

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
	40.5		2.5	CC

Language(s) for the course

- English

Descriptif

Our students are trained to enter the professional world where it is essential to be able to work in English. All four language skills (listening and reading, writing and speaking) are regularly practised. Our students are placed in learning contexts and situations where they can keep fine tuning their comprehension and communication skills, through role plays and debates, mock interviews, professional projects...,etc.

1.2. LANG902 - Foreing Language (above TOEIC Level)

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
	35		2.5	CC

Descriptif

A 15-hour course in English: Culture, civilisation and language.

And a 20-hour course in a second foreign language in:

- Spanish, German et Italian at Chambéry and Annecy (no beginners).
- Chinese and Japanese at Annecy (beginners accepted)

1.3. PROJ901 - R and D Project

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
		40	6	Pratique + Rapport + Soutenance

Language(s) for the course

- French

Descriptif

This work consists of an introduction to fundamental or applied research. It is carried out in pairs on a subject proposed by the industrial world or by a research laboratory. The first part of the project concerns a state of the art of knowledge and/or techniques on the subject, the identification of the method and/or technique that will be implemented as part of the project, and the development of an experience or work plan to address the problem.

The second part of the work concerns the realization of the study and the analysis of the results

1.4. SHES901 - Management

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
15	7.5		1.5	CC

Language(s) for the course

- French

Descriptif

Course description: This SHES course is made up of 2 independent modules : Management and Ethics. The objective of this module is to grasp the human and communication aspects of management and to develop the students' managerial assertion

2. UE902 : Process Engineering and Energy

2.1. ENER921 - Energy Processes

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
38	37	28	8	CC

Language(s) for the course

- French

Descriptif

This module deals with the exploitation of the main renewable energy sources: solar, hydro, wind, and geothermal. It addresses the resources to their exploitation through the transformation of energy and its storage,

It consists of three independent parts, each dealing with a family of resources, and a common part on energy storage. A TP component completes the training

2.2. GEDP921 - Treatment of gas contamination

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
20	20	8	4	CC

Language(s) for the course

- French

Descriptif

The aim of this course is to provide the knowledge needed to understand and treat gaseous pollution encountered in different area, especially those related to waste treatment and waste valorization, waste water treatment and incineration field.

3. UE903 : Promoting renewable energy

3.1. ENER922 - Networks and Storage

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
16	20		3	CC

Language(s) for the course

- English

Descriptif

Presentation of energy networks at the scale of the territory (electricity, heat and gas), their management and interconnections.

3.2. PROJ921 - Problem-based learning: Organic Waste and Energy

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
20	44	8	4	CC

Language(s) for the course

- French

Descriptif

The objective of this course is

- to understand the challenges of specific collection and treatment of organic and biowaste
- to be able to size a methanization facility, provide cost-effective set up of a biogas palnt, territorial or on-farm project,
- to understand principles and implement composting facilities.,
- to understand and manage the impact of the diversion of organic matter from incineration.

The operational objective of the Project Based Learning is the sizing of a biogas plantfor a community or farmer, including valrization of the biogas.

3.3. SHES921 - Energy and Environmental Laws, Public Market

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
24	16		3	CC

Language(s) for the course

- French

Descriptif

Energy and environmental law; Market Law, Energy Transition Law

Semester 10

UE	ECTS	Module	Course name	Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
UE001 : Internship	30	PROJ001	Internship				30	Soutenance, rapport écrit, évaluation entreprise

1. UE001 : Internship

1.1. PROJ001 - Internship

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
			30	Soutenance, rapport écrit, évaluation entreprise

Language(s) for the course

- French

Descriptif

This Internship takes place in a company in which engineering students have one (or more) task (s) to achieve, close (s) to his future engineering function, integrating a project approach with technical, economic and social aspects. These aspects should be highlighted in the written and oral presentation of the course even if the engineering student has not been the direct actor.