

Learning menu proposal

Energy - Building – Environment

In the frame of our ERASMUS+ agreement, the department EBE at the school of Engineering Polytech Annecy-Chambéry, faculty of engineering of the university Savoie Mont-Blanc, France, has the pleasure to propose a specific programme, designed for students at NTNU.

It has been specifically design for students who believe their knowledge in French language is not enough to already start with lectures in French.

So, the autumn semester is made of compulsory lectures given in English, in the field of Solar energy.

With a huge knowledge in the field of renewable energies, Polytech Annecy-Chambéry and his devoted laboratory LOCIE is mainly focused on solar energy, as a partner of the National research Institute on Solar Energy, INES, hosted on our campus.

This menu consisting of 30 ECTS is completed with lectures in French language and culture for almost 3 ECTS, and the possibility to attend sports activities for 1 or 2 ECTS.

	Program	Course leader	ECTS	Lectures	Tutorials	Labs	TOTAL (h)	
Fall Semester (S9)	UE1 : Solar Energy, Storage and Networks		13				108.5	30 ECTS 249 h
	Solar thermal	N. Le-Pierres	4	18	18		36	
	Solar photovoltaic	F. Domain	4	16.5	19.5		36	
	Energy storage and networks (district heating, smart grids)	N. Le-Pierres	5	19.5	9	8	36.5	
	UE2 : Smart systems and experimental methods		9				68.5	
	Representation and optimization tools (genetic algorithms, neural networks...)	S.Galichet	4	12	9	12	33	
	Measurements (flow, temperature, pressure ...) and experimental methods (database ...)	M. Pailha	5	19.5	12	4	35.5	
	UE3 : Modeling, optimization and control		8				72	
	Advanced building modeling (heat and mass transfer)	M. Woloszyn	4	21	15		36	
	Numerical tools (CFD, systems, optimization)	M. Chhay	4			36	36	
	Individual research project	S. Rouchier	30			6	6	

Then, for spring semester, as your French language skills will have deeply increased, you will be able to attend to lectures given in French in a wider selection of lectures, in the fourth year of engineering curriculum (code semester 8, lecture codes 8xx) mainly grouped into 3 syllabus :

Sustainable buildings (UE course code “IB”)

Energy (UE courses code “EN”)

Environmental engineering (UE course code “GE”)

If you don't feel enough comfortable, you could still attend to the ERASMUS+ French language and culture lectures, and of course, practice sports.

UE	ECTS	EC	Course name	Class (h)	Exer. (h)	Lab. (h)	Coef.	Examination
UE1 : EN (option- al unit)	8	ENER811b	Energetics	30	37.5		4.5	CC
		ENER812b	Fluid engineering applied to energy	34.5	15	4	3.5	CC
UE1 : GE (option- al unit)	8	CHIM815	Industrial Risk Management	9	4.5		1	CC
		CHIM816	Environmen- tal pollution: Monitoring and Assessment	9	3	22	2	CC
		GDP814	Energy from Waste and Biomass	31.5	35	6	5	CC
UE1 : IB (option- al unit)	8	GCH811b	Reinforced Concrete	27	39		4.5	CC
		GCH812b	Geotechnics	13.5	16.5	24	3.5	CC(0,6) + TP(0,4)
UE2 : EN (option- al unit)	8	ENER816	Innovative en- ergy systems: Fuel Cells and Cogeneration	21	21		2.5	CC
		ENER817	Renewable en- ergy systems : Wood energy - Geothermal and Air heat pumps	21	33		3.5	CC
		GCH818	Energy and buildings	9	6	16	2	CC
UE2 : GE (option- al unit)	8	CHIM814	Water treatment	13.5	12	24	3	ET (0,5) + TP (0,5)
		GDP813	Kinetics and Re- actor Design	31.5	31.5	16	5	
UE2 : IB (option- al unit)	8	GCH816	Wood struc- tures and steel structures	27	30		3.5	CC
		GCH817	Building's Physics	15	12	40	4.5	
UE3 : In- ternship	8	PROJ801a	Engineering as- sistant internship				6	Rapport écrit et soutenance orale
		PROJ811	Project			12	2	CC
UE4 : TC	6	LV801	English		40.5		3	CC

		LV802	Foreign languages (above Toeic level)		30		3	CC
		SHES802	Corporate strategy - Innovation	19.5			1.5	ET
		SHES802bis	Sustainable Development and Integrated Management System QSE (Quality Safety Environment)	9	10.5		1.5	CC

Details of the courses offered

UE1 EN (optional unit)

1.1. ENER811b - Energetics

Class (h) Exer. (h) Lab. (h) Coef. Examination

30 37.5 4.5 CC

Language(s) for the course

- French

Course description

This advanced course follows the basic courses of thermodynamics and heat transfer of semesters 5 and 6.

The thermodynamics part deals with energy systems and compounds. Energy and entropy balances are explained and applied to energy systems (engines, gas turbines, vapor cycles, heat pumps...)

The heat transfer explains the physical phenomena governing convective heat transfers and heat transfers with liquid-vapor phase change. It describes and implements the main correlations useful to engineers to quantify such heat transfer applied to areas related to the environment, building and energy production.

1.2. ENER812b - Fluid engineering applied to energy

Class (h) Exer. (h) Lab. (h) Coef. Examination

34.5 15 4 3.5 CC

Language(s) for the course

- French

Course description

This course covers the basic concepts needed to understand hydro, wind, and sea renewables energies: the identification of resources for their operation through the transformation of energy, environmental impact, and challenges.

It consists of three separate parts related to the different energy resources. It includes a common course on advanced fluid mechanics for the acquisition of scientific and technical basis for the understanding of fluid applications.

2. UE1 : GE (optional unit)

2.1. CHIM815 - Industrial Risk Management

Class (h) Exer. (h) Lab. (h) Coef. Examination

9 4.5 1 CC

Language(s) for the course

- French

Course description

The objective of this course is to provide the legislative framework and guidelines for risk assessment associated with hazardous chemicals (Toxicological Risk, fire risk, reactors safety).

Semester 8

17

2.2. CHIM816 - Environmental pollution: Monitoring and Assessment

Class (h) Exer. (h) Lab. (h) Coef. Examination

9 3 22 2 CC

Language(s) for the course

- French

Course description

This course aims to provide knowledge of measurement techniques of pollutants and assessment strategies of chemical contamination phenomena for air and water environments.

2.3. GDP814 - Energy from Waste and Biomass

Class (h) Exer. (h) Lab. (h) Coef. Examination

31.5 35 6 5 CC

Language(s) for the course

- French

Course description

To know and control the various branches of organic waste treatment, irrespective of their forms of recovery, be it energetic or material, the environmental impacts of these sectors, the basics of a project to valorize these organic wastes, both from a technical, financial or regulatory point of view.

3. UE1 : IB (optional unit)

3.1. GCH811b - Reinforced Concrete

Class (h) Exer. (h) Lab. (h) Coef. Examination

27 39 4.5 CC

Language(s) for the course

- French

Course description

Design reinforced concrete structures following Eurocode 2

3.2. GCH812b - Geotechnics

Class (h) Exer. (h) Lab. (h) Coef. Examination

13.5 16.5 24 3.5 CC(0,6) + TP(0,4)

Language(s) for the course

- French

Course description

- Presentation of technical aspects and standards concerning the design of elements such as foundations and retaining walls.
- Practical classes deal with soil characterization tests and soil mechanics tests

4. UE2 : EN (optional unit)**4.1. ENER816 - Innovative energy systems: Fuel Cells and Cogeneration****Class (h) Exer. (h) Lab. (h) Coef. Examination**

21 21 2.5 CC

Language(s) for the course

- French

Course description

This course is an introduction to energy systems based on the "Hydrogen" vector. The energy chain considered includes production, storage and use of hydrogen in fuel cells, as well as safety aspects related to this energy vector.

Semester 8

18

In addition, an introduction to cogeneration systems addresses the technical and economic aspects for the design of such a facility.

4.2. ENER817 - Renewable energy systems : Wood energy - Geothermal and**Air heat pumps****Class (h) Exer. (h) Lab. (h) Coef. Examination**

21 33 3.5 CC

Language(s) for the course

- French

Course description

Scientific and technical basis for the development of professional wood energy projects, and ground source heat pump projects or air source heat pump projects.

4.3. GCH818 - Energy and buildings**Class (h) Exer. (h) Lab. (h) Coef. Examination**

9 6 16 2 CC

Language(s) for the course

- French

Course description

This course involves both the study of the thermal behavior of premises and evaluation of overall energy performance (building envelope and systems) with numerical tools. It takes into account the hygrothermal occupant comfort and is the basis for the design of HVAC systems (calculation of thermal loads) and calculations related to the French thermal regulation (RT2012).

5. UE2 : GE (optional unit)**5.1. CHIM814 - Water treatment****Class (h) Exer. (h) Lab. (h) Coef. Examination**

13.5 12 24 3 ET (0,5) + TP (0,5)

Language(s) for the course

- French

Course description

Theory of physical and chemical water treatments with a special emphasis on drinking: clarification, softening, mineralization and alkalinity, absorption on activated carbon, disinfection and chemical oxidation.

5.2. GDP813 - Kinetics and Reactor Design

Class (h) Exer. (h) Lab. (h) Coef. Examination

31.5 31.5 16 5

Language(s) for the course

- French

Course description

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 to chemical reactions in order to apply these concepts to the field of the gaseous and liquid processes.

6. UE2 : IB (optional unit)**6.1. GCH816 - Wood structures and steel structures**

Class (h) Exer. (h) Lab. (h) Coef. Examination

27 30 3.5 CC

Semester 8

19

Language(s) for the course

- French

Course description

Design of elements and building involving wood or steel. Practical classes following the standards.

6.2. GCH817 - Building's Physics

Class (h) Exer. (h) Lab. (h) Coef. Examination

15 12 40 4.5

Language(s) for the course

- French

Course description

This is an advanced course on building energy performance, including regulations and building physics. Moisture transfers in building components are analyzed, as well as air infiltrations through building envelope. Moreover building performance simulation tools are applied. Some laboratory experiments in building physics are also included.

7. UE3 : Internship**7.1. PROJ801a - Engineering assistant internship**

Class (h) Exer. (h) Lab. (h) Coef. Examination

6 Rapport écrit et

soutenance orale

Language(s) for the course

- French
- English

Course description

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.

7.2. PROJ811 - Project

Class (h) Exer. (h) Lab. (h) Coef. Examination

12 2 CC

Language(s) for the course

- French

Course description

As part of a larger team, the student will participate in the development of a project related to his studies.

8. UE4 : TC

8.1. LV801 - English

Class (h) Exer. (h) Lab. (h) Coef. Examination

40.5 3 CC

Language(s) for the course

- English

Semester 8

20

Course description

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.

8.2. LV802 - Foreign languages (above Toeic level)

Class (h) Exer. (h) Lab. (h) Coef. Examination

30 3 CC

Language(s) for the course

- French
- French with documents in english
- English

Course description

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

And a 15-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)

8.3. SHES802 - Corporate strategy - Innovation

Class (h) Exer. (h) Lab. (h) Coef. Examination

19.5 1.5 ET

Language(s) for the course

- French

Course description

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.

8.4. SHES802bis - Sustainable Development and Integrated Management

System QSE (Quality Safety Environment)

Class (h) Exer. (h) Lab. (h) Coef. Examination

9 10.5 1.5 CC

Language(s) for the course

- French

Course description

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.

Please note that, for timetable reasons, EN ,GE and IB syllabus are mainly exclusive and incompatible.

All these lectures are given on our Le Bourget Campus, except French Language and Culture that are given downtown Chambéry, and sports (depending on the chosen sport) downtown or in Le Bourget.

LOCATION: Université Savoie Mont Blanc, Polytech Annecy-Chambéry, Le Bourget du Lac, France

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