



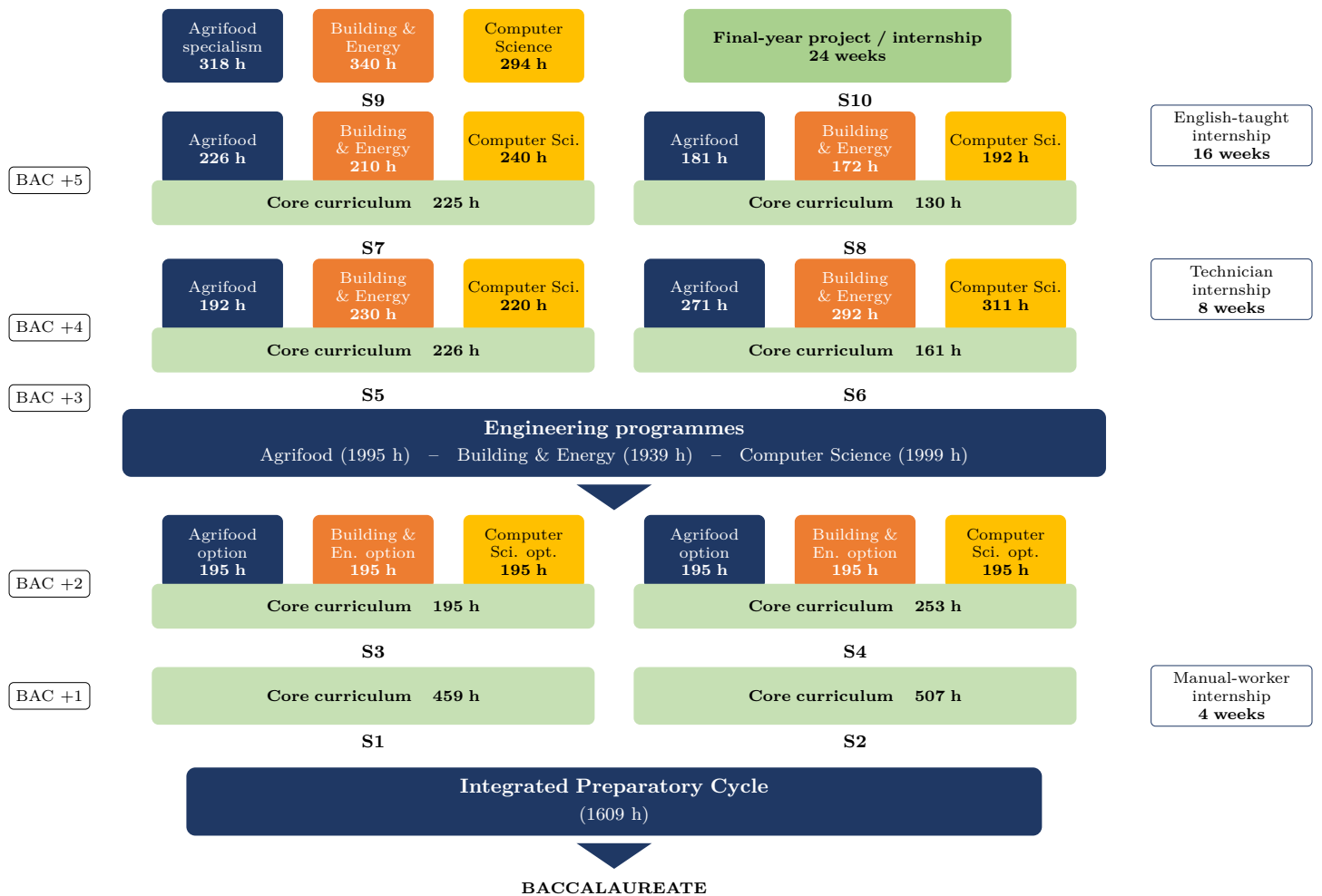
Syllabus of courses

ESIROI | University of La Réunion

ACADEMIC YEAR 2026 - 2027

CTI accreditation 2025 - 2030

Training programmes



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Curriculum overview

Bâtiment et énergie — 3A		SEMESTER S5			
Code	Title	CM	TD	TP	ECTS
UE5.1-STRUC: UE5.1-STRUC					
E3BE5ST1	Statically determinate structures	7	23	16	2.5
E3BE5ST2	Continuum Mechanics	7	25	0	2
E3BE5ST3	SAE	0	4	0	0
E3BE5ST4	Construction Materials	7	21	0	1
E3BE5ST5	Construction Techniques	4	12	8	1
E3BE5ST6	L2 or intensive English	0	10	0	1
UE5.2-QEB: UE5.2-QEB					
E3BE5QE1	Energy and climate context	2	6	0	1
E3BE5QE2	TES 1: Anthropocene and Diversity, Equity, Inclusion	12	4	0	2
E3BE5QE3	Data Processing	4	12	0	1
E3BE5QE4	Interpersonal and intrapersonal communication	3	9	4	0.5
E3BE5QE5	Fluid Mechanics	7	21	8	2
E3BE5QE6	Mathematics Complements	8	24	0	1
UE5.3-EFFI: UE5.3-EFFI					
E3BE5EF1	Energy Thermodynamics	6	22	8	1.5
E3BE5EF2	Analysis of Building Flows	2	6	4	1
E3BE5EF3	Programming for Building and Energy	2	6	8	1
E3BE5EF4	Sports	0	12	0	1
E3BE5EF5	Project Management	1	3	16	1
E3BE5EF6	Project	0	0	0	2
UE5.4-PROEN: UE5.4-PROEN					
E3BE5PR1	Solar resource	3	9	0	1
E3BE5PR2	Innovation Methodology	8	0	20	1
E3BE5PR3	Report writing and documentation review	3	9	0	1
E3BE5PR4	English	0	20	10	3
E3BE5PR5	SAÉ	0	4	0	
E3BE5PR6	Photovoltaics 1: Technology and Sizing	4	16	8	1.5

Bâtiment et énergie — 3A		SEMESTER S6			
Code	Title	CM	TD	TP	ECTS
UE6.1-STRUC: UE6.1-STRUC					
E3BE6ST1	Geotechnical Engineering	5	11	12	2
E3BE6ST2	Introduction to Building Digital Mock-ups	7	17	0	2
E3BE6ST3	Statically indeterminate structures	9	19	12	2.5

Bâtiment et énergie — 3A		SEMESTER S6			
Code	Title	CM	TD	TP	ECTS
E3BE6ST4	LV2 or intensive English	0	10	0	1
UE6.2-QEB: UE6.2-QEB					
E3B65QE1	Dynamic Thermal Simulation 1	3	9	8	2
E3B65QE2	Bioclimatic Design and Comfort	4	12	4	2.5
E3B65QE3	SAÉ	0	4	0	0
E3B65QE4	Mass and Heat Transfer	6	20	0	1.5
E3B65QE5	TES 2: New Economic and Governance Models	6	0	0	0.5
E3B65QE6	TES 2: LCA and Carbon Footprint	2	12	0	1
UE6.3-EFFI: UE6.3-EFFI					
E3B65EF1	Sports	0	12	0	1
E3B65EF2	Climate Engineering	8	24	4	2
E3B65EF3	Methodology for Problem Analysis and Resolution	1	3	8	1
E3B65EF4	SAÉ	0	4	0	0
E3B65EF5	Heat and Cold Production	6	18	4	1.5
E3B65EF6	Project	0	0	0	2
UE6.4-PROEN: UE6.4-PROEN					
E3B65PR1	Solar Thermal 1: Technology and Sizing	5	15	8	2.5
E3B65PR2	Electrical Conversion	4	12	8	2
E3B65PR3	English	0	20	10	3
E3B65PR4	Portfolio	0	0	0	0

Bâtiment et énergie — 4A		SEMESTER S7			
Code	Title	CM	TD	TP	ECTS
UE7-EFFI: UE7-EFFI : Efficacité énergétique des systèmes S7					
ESI-SPI-CI-BE4-S7-UE3-EC1	Energy Storage	8	12	0	1
ESI-SPI-CI-BE4-S7-UE3-EC2	Cogeneration and Innovative Energy Systems	8	8	4	1
ESI-SPI-CI-BE4-S7-UE3-EC3	Innovation competition	4	0	16	2
ESI-SPI-CI-BE4-S7-UE3-EC4	General Accounting	8	8	0	1
ESI-SPI-CI-BE4-S7-UE3-EC5	Introduction to Research	8	0	0	0.5

Bâtiment et énergie — 4A		SEMESTER S7			
Code	Title	CM	TD	TP	ECTS
ESI-SPI-CI- BE4-S7-UE3- EC6	Project	2	0	0	2
UE7-PROEN: UE7-PROEN : Production d'énergie renouvelable S7					
ESI-SPI-CI- BE4-S7-UE4- EC1	Logistics Systems	8	12	0	2
ESI-SPI-CI- BE4-S7-UE4- EC2	Photovoltaics 2: Modelling and Performance Indicators	4	8	0	2.5
ESI-SPI-CI- BE4-S7-UE4- EC3	SAE	4	0	0	0
ESI-SPI-CI- BE4-S7-UE4- EC4	English	0	20	10	3
UE7-QEB: UE7-QEB : Qualité environnementale des Bâtiments S7					
ESI-SPI-CI- BE4-S7-UE2- EC1	Survey Management and Occupancy Mode Evaluation	4	8	4	1
ESI-SPI-CI- BE4-S7-UE2- EC2	Dynamic Thermal Simulation 2	4	12	0	1
ESI-SPI-CI- BE4-S7-UE2- EC3	TES 3: SST, CSR, Engineering Ethics	22	0	0	3
ESI-SPI-CI- BE4-S7-UE2- EC4	Sports	0	12	0	1
ESI-SPI-CI- BE4-S7-UE2- EC5	Regulations on disability and fire safety	16	8	4	1
ESI-SPI-CI- BE4-S7-UE2- EC6	Business English	8	8	0	0.5
UE7-STRUC: UE7-STRUC : Structure des bâtiments S7					
ESI-SPI-CI- BE4-S7-UE1- EC1	Labour and Business Law	8	8	0	0.5
ESI-SPI-CI- BE4-S7-UE1- EC2	Load analysis and bracing design	8	16	0	2
ESI-SPI-CI- BE4-S7-UE1- EC3	SAE	4	0	0	0

Bâtiment et énergie — 4A		SEMESTER S7			
Code	Title	CM	TD	TP	ECTS
ESI-SPI-CI-BE4-S7-UE1-EC4	Reinforced concrete structures	12	16	0	2
ESI-SPI-CI-BE4-S7-UE1-EC5	Steel structures	12	12	2	2
ESI-SPI-CI-BE4-S7-UE1-EC6	L2 or intensive English	0	10	0	1

Bâtiment et énergie — 4A		SEMESTER S8			
Code	Title	CM	TD	TP	ECTS
UE8-EFFI: UE8-EFFI : Efficacité énergétique des systèmes S8					
ESI-SPI-CI-BE4-S8-UE3-EC1	Energy Performance Diagnosis and Improvement	4	8	0	1.5
ESI-SPI-CI-BE4-S8-UE3-EC2	Innovation competition	0	4	10	1
ESI-SPI-CI-BE4-S8-UE3-EC3	Functional analysis applied to the construction process	4	4	0	1.5
ESI-SPI-CI-BE4-S8-UE3-EC4	SAE	4	0	0	0
ESI-SPI-CI-BE4-S8-UE3-EC5	Project	2	0	0	2
ESI-SPI-CI-BE4-S8-UE3-EC6	Management and Leadership	8	8	0	1.5
ESI-SPI-CI-BE4-S8-UE3-EC7	Portfolio	0	0	0	0
UE8-PROEN: UE8-PROEN : Production d'énergie renouvelable S8					
ESI-SPI-CI-BE4-S8-UE4-EC1	English	0	20	10	3
ESI-SPI-CI-BE4-S8-UE4-EC2	Entrepreneurship	8	12	0	1.5

Bâtiment et énergie — 4A		SEMESTER S8			
Code	Title	CM	TD	TP	ECTS
ESI-SPI-CI-BE4-S8-UE4-EC3	Other RES than solar	0	12	0	1.5
ESI-SPI-CI-BE4-S8-UE4-EC4	Solar Thermal 2: Modeling and Performance Indicators	4	8	0	1.5
UE8-QEB: UE8-QEB : Qualité environnementale des Bâtiments S8					
ESI-SPI-CI-BE4-S8-UE2-EC1	Thermal regulations and labels	4	8	0	1.5
ESI-SPI-CI-BE4-S8-UE2-EC2	Sports	0	12	0	1
ESI-SPI-CI-BE4-S8-UE2-EC3	SAE	4	0	0	
ESI-SPI-CI-BE4-S8-UE2-EC4	Building Maintenance and Operations	8	0	12	1.5
ESI-SPI-CI-BE4-S8-UE2-EC5	Lighting and Acoustics	12	12	16	2.5
ESI-SPI-CI-BE4-S8-UE2-EC6	Workshop architecture	4	0	0	1
UE8-STRUC: UE8-STRUC : Structure des bâtiments S8					
ESI-SPI-CI-BE4-S8-UE1-EC1	Human Resources Management	4	12	0	3
ESI-SPI-CI-BE4-S8-UE1-EC2	Timber Structures	12	12	0	3.5
ESI-SPI-CI-BE4-S8-UE1-EC3	L2 or intensive English		10	0	1

Bâtiment et énergie — 5A		SEMESTER S9			
Code	Title	CM	TD	TP	ECTS
Aménagement: Aménagement en zone tropicale					
E5BE9ZP1	BIM Management	2	10	8	2
E5BE9ZP2	Urban Planning MT	8	24	0	3
Anglais: Anglais					

Bâtiment et énergie — 5A		SEMESTER S9			
Code	Title	CM	TD	TP	ECTS
E5BE9AN1	English				
Conception: Conception de bâtiments à énergie positive en zone tropicale					
E5BE9CB1	NetZEB, POE, Sustainable design	4	12	16	2.5
E5BE9CB2	Aerodynamics	4	12	8	2
E5BE9CB3	Software Tools in Energy Simulation 2	2	2	16	1.5
Modélisation: Modélisation et structures					
E5BE9MS1	Modelling	5	15	0	2
E5BE9MS2	Finite Element Modeling of Structures	4	24	0	2
E5BE9MS3	Seismic and Cyclonic Risk	4	12	0	1
Montage: Montage d'opération et gestion de patrimoine					
E5BE9MO1	Real estate project structuring	4	12		1.5
E5BE9MO2	Wealth Management	8	16	8	1.5
Projet: Projet					
E5BE9PR1	Final Year Project				
Énergies: Énergies renouvelables					
E5BE9ER1	Renewable Energies (excluding solar)	6	18		2.5
E5BE9ER2	Waste Management and Valorization (2 lab sessions)	6	18	8	2.5

Bâtiment et énergie — 5A		SEMESTER S10			
Code	Title	CM	TD	TP	ECTS
Stages: Stages					
E5TC10L1	English-speaking internship	0	0	0	10
E5TC10L2	Final-year internship	0	0	0	20

IDENTIFICATION

Course code : E3BE5ST1
ECTS : 2.5

DURATION

Lectures : 7
Tutorial classes : 23
Labs : 16
Total : 46

Project :
Personnal work :

ASSESSMENT

2 continuous assessments - 3 practical work sessions

TEACHING MATERIALS

Course material

LANGUAGE

English

CONTACT

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Modifié le : 3 août 2026

UE : UE5.1-STRUC

COURSE : Statically determinate structures

SCOPE OF THE COURSE

OBJECTIVES

Students are able to, for any statically determinate system : • Calculate external mechanical actions from a torsor • Plot shear force and bending moment diagrams (cohesion torsor) • Calculate and represent normal and shear stresses • Calculate deformations and deflected shapes • Perform preliminary sizing (ULS and SLS)

COMPETENCE AND SKILLS

Know how to determine external mechanical actions, plot shear force and bending moment diagrams, calculate and represent normal and shear stresses, calculate deformations and deflected shapes for any statically determinate structure.

PROGRAM

• Different aspects of mechanics • Mathematical reminders for mechanics • Vector systems - Torsor concept • Modeling of mechanical actions • Fundamental principle of statics • Beam theory • Study of geometric characteristics of a beam cross-section • Study of simple stresses • Study of combined stresses

BIBLIOGRAPHY

Mécanique des structures : Rappels de cours et applications, José Ouin, Castella

REQUIREMENTS

Mathematics course ; Continuum Mechanics

IDENTIFICATION

Course code : E3BE5ST2
ECTS : 2

DURATION

Lectures : 7
Tutorial classes : 25
Labs : 0
Total : 32

Project :
Personnal work :

ASSESSMENT

2 continuous assessments

TEACHING MATERIALS

course material

LANGUAGE

English

CONTACT

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Modifié le : 3 août 2026

UE : UE5.1-STRUC

COURSE : Continuum Mechanics

SCOPE OF THE COURSE

OBJECTIVES

By the end of this course, students will be able to use tensor analysis and algebra tools to describe deformations and stresses in a simple continuous medium.

COMPETENCE AND SKILLS

Use tensors to describe deformations (strain tensor) and stresses (stress tensor). Describe motions and deformations in a continuous medium. Determine principal strains and stresses. Understand and use Mohr's circle. Determine stresses using strain gauges (rosettes).

PROGRAM

BIBLIOGRAPHY

Mécanique des milieux continus, Jean Coirier, Carole Nadot-Martin.

REQUIREMENTS

Matrix calculus, diagonalization (and corresponding linear algebra), vector calculus, differential calculus at L2 level. Basic trigonometry.

IDENTIFICATION

Course code : E3BE5ST3
ECTS : 0

DURATION

Lectures : 0
Tutorial classes : 4
Labs : 0
Total : 4

Project :
Personnal work :

ASSESSMENT

Critical learning outcomes will be assessed based on the elements provided in deliverables, using a criterion-based rubric presented to students in advance, as well as an oral presentation.

TEACHING MATERIALS

All documents used during instruction. If necessary, additional reference materials may be consulted.

LANGUAGE

English

CONTACT

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Modifié le : 3 août 2026

UE5.1-STRUC

SAE

SCOPE OF THE CHALLENGE

WORKING SITUATION

STRUC Competency - Level 1 Design and size the structure of building-type structures, particularly in extreme environments

COMPETENCES AND LEVEL ASSESSED

- Identify and analyze the essential elements of a structure • Select construction materials based on constraints (economic, environmental, mechanical, thermal)
- Calculate loads, stresses, and deflections • Justify the choices made and the results obtained

EXPECTED OUTPUTS

- Synthetic and detailed presentation of the project, with a focus on the structural elements to be studied • Comparative study of materials and selection of the 2 most suitable materials based on environmental and mechanical constraints
- Drafting of 2 calculation notes for the structural elements (stresses, deflections) • Cost analysis of the 2 solutions • 1 300-word text in English or Spanish justifying the selected solution • Oral presentation to your supervisor

Evaluation criteria will be defined in the criterion-based grid provided to engineering students in advance.

RESOURCES

— Lecturer in Isostatic Structures — Construction Materials — Construction Techniques — Spanish or English

IDENTIFICATION

Course code : E3BE5ST4
ECTS : 1

DURATION

Lectures : 7
Tutorial classes : 21
Labs : 0
Total : 28

Project :
Personnal work :

ASSESSMENT

An oral presentation and a written synthesis - Group work

TEACHING MATERIALS

course material

LANGUAGE

English

CONTACT

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Modifié le : 3 août 2026

UE : UE5.1-STRUC

COURSE : Construction Materials

SCOPE OF THE COURSE

OBJECTIVES

The objective is to analyse the physical and mechanical characteristics of construction materials.

COMPETENCE AND SKILLS

Select the most suitable construction material mechanically and physically based on the structural element studied and the intended use of the structure

PROGRAM

Concrete material applied to structures : concrete constituents ; Portland cement manufacturing ; Designation of concrete (Standard NF EN 206-1) ; Different types of concrete (BA, BP, self-compacting concrete, etc.) ; Physical and mechanical characteristics (compressive strength, tensile strength, etc.) ; thermal inertia, fire resistance, recycling, sustainable construction, acoustics)

Steel material : Technology (vocabulary, steel products, fatigue, corrosion, etc.) ; Steel production (processes, hot rolling, etc.) ; Physical and mechanical characteristics (stress-strain law, etc.) ; Connections (welding, ordinary bolts, pre-stressed bolts, rigid, semi-rigid, flexible connections) ; Characteristics of structures (cladding, portal frame, truss, etc. Stability - bracing concept)

Wood material : Technology (vocabulary, etc.) ; Production of wood elements (process) ; Physical and mechanical characteristics ; Wood deterioration ; Characteristics of structures Bio-based material : identification of bio-based materials ; Physical and mechanical characteristics ; Deterioration ; Characteristics of structures

BIBLIOGRAPHY

Wood Construction ; Steel Construction ; Concrete Construction

REQUIREMENTS

Construction Techniques course - Isostatic Structure course

IDENTIFICATION

Course code : E3BE5ST5
ECTS : 1

DURATION

Lectures : 4
Tutorial classes : 12
Labs : 8
Total : 24

Project :
Personnal work :

ASSESSMENT

An oral presentation and a written summary of the DCE - Group work

TEACHING MATERIALS

course material - 1 Construction Companies Consultation File (DCE)

LANGUAGE

English

CONTACT

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Modifié le : 3 août 2026

UE : UE5.1-STRUC

COURSE : Construction Techniques

SCOPE OF THE COURSE

OBJECTIVES

Students are able to, based on a DCE : • Present the file as a whole, • Identify the nature and characteristics of the soils, • Describe the main infrastructure and superstructure works (from foundations to roof), • Propose a construction solution, • Understand load transfer based on execution plans.

COMPETENCE AND SKILLS

Present the role and characteristics of the different structural elements of a building

PROGRAM

• Reading plans (Technical drawing standards NFP 02-001) • The different parts of a DCE (composition and information retrieval) • Building terminology (vocabulary) • The different elements of a construction (Infrastructure, superstructure, structural works, finishing works, etc.) • Load transfer (beam, shear wall, ribbed slab, etc.)

BIBLIOGRAPHY

Précis de chantier ; Précis du bâtiment ;

REQUIREMENTS

Technical drawing course

IDENTIFICATION

Course code : E3BE5ST6
ECTS : 1

DURATION

Lectures : 0
Tutorial classes : 10
Labs : 0
Total : 10

Project :
Personnal work :

ASSESSMENT

At least two continuous assessments.

TEACHING MATERIALS

Slides and guided work sheets.

LANGUAGE

English

CONTACT

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Modifié le : 3 août 2026

UE : UE5.1-STRUC

COURSE : L2 or intensive English

SCOPE OF THE COURSE

OBJECTIVES

This course aims to develop students' linguistic, cultural, and communicative skills in a second modern language (Chinese or Spanish). It focuses on acquiring language fundamentals, oral and written fluency, as well as discovering associated cultures, to prepare students for interactions in personal, professional, or academic contexts.

COMPETENCE AND SKILLS

- Communicate with various stakeholders (clients, management, users, IT managers, authorities -CNIL, ANSSI-) in writing and orally
- Ensure appropriate communication with stakeholders, including clients, administrations, citizens, and civil society.

PROGRAM

1. Language initiation

- Basic grammatical structures : present tense, adjectives, pronouns.

2. Oral communication

- Techniques to improve pronunciation and oral fluency.

3. Written comprehension and expression

- Writing simple letters or emails (self-introduction, information requests).

4. Linguistic and intercultural deepening

- Study of songs, poems, or literary excerpts adapted to the level.

5. Practical project and continuous assessment

- Regular oral and written evaluations to monitor progress.

BIBLIOGRAPHY

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REQUIREMENTS

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IDENTIFICATION

Course code : E3BE5QE1
ECTS : 1

DURATION

Lectures : 2
Tutorial classes : 6
Labs : 0
Total : 8

Project :
Personnal work :

ASSESSMENT

1 continuous assessment grade

TEACHING MATERIALS

Course materials

LANGUAGE

English

CONTACT

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Modifié le : 3 août 2026

UE : UE5.2-QEB

COURSE : Energy and climate context

SCOPE OF THE COURSE

OBJECTIVES

The objective of this course is to understand the technical and economic challenges of the energy sector, to know the systems for mass energy production and distribution.

COMPETENCE AND SKILLS

Understand the technical and economic challenges of the energy sector, Basic knowledge of mass energy production and distribution systems.

PROGRAM

Regional, national and international political context :

- Réunion Island Climate Energy Plan and Agenda 21
- Grenelle I and II
- SRI/S3 and European H2020

Energy markets and energy policy :

- Coal, oil, natural gas, electricity, renewable energies
- Other contractual and commercial aspects of energy
- Examples of district heating networks
- National energy policy mechanisms
- Territorial energy policy strategy (Agenda 21, local authorities, etc.)

Conventional electricity production systems : thermal and hydraulic. Electricity distribution networks. Supply-demand balance. Constraints of production and distribution management in an island context (non-interconnected). Energy mix with an increasing share of renewable energy production.

BIBLIOGRAPHY

Bernard CHABOT ; The new wind energy pricing : genesis, description and first analysis ; Revue de l'énergie ; no. 528 ; 2001
Bernard CHABOT ; Some strategic conclusions drawn from an economic analysis of wind energy based on simple and innovative methods and tools ; Entropie ; no. 230, pp. 54-62 ; March 2001

REQUIREMENTS

IDENTIFICATION

Course code : E3BE5QE2
ECTS : 2

DURATION

Lectures : 12
Tutorial classes : 4
Labs : 0
Total : 16

Project :
Personnal work :

ASSESSMENT

Individual assessment Oral presentation
Submission of a report

TEACHING MATERIALS

Course materials

LANGUAGE

English

CONTACT

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Modifié le : 3 août 2026

UE : UE5.2-QEB

COURSE : TES 1 : Anthropocene and Diversity,
Equity, Inclusion

SCOPE OF THE COURSE

OBJECTIVES

Understand the functioning of the Earth system and its evolution (past, present, future) by highlighting the unprecedented nature of current changes (pace, great acceleration) and tipping phenomena, demonstrating the anthropogenic origin of these disturbances, and considering all time scales

Gain an overview of forms of inequality and discrimination in professional settings

COMPETENCE AND SKILLS

— Reduce the environmental impact of a product and integrate the challenges of a just, equitable, and inclusive ecological transition

— Integrate the challenges of a just, equitable, and inclusive ecological transition

PROGRAM

12h (10h lectures / 2h tutorials) - The Anthropocene : origins and global challenges — Climate and energy transitions — Biodiversity and living systems challenges — Natural resource management — Solutions and perspectives : toward a sustainable future

4h (2h lectures / 2h tutorials) - Collective workshop during integration week :
— Preventing inequalities and discrimination in human resources management

BIBLIOGRAPHY

UVED portal - MOOC

ISO 30415 : Human resource management - Diversity and inclusion, September 2021. ISO 53800 : Guidelines for promoting and implementing gender equality and women's empowerment, May 2024. AFNOR SPEC Z77-103-0 : Digital inclusion : Best practices guide for tailored adaptation, February 2022 Guide for non-discriminatory recruitment, French Ombudsman, June 2019. Discrimination based on sexual orientation and gender identity, French Ombudsman, March 2020.

REQUIREMENTS

None

IDENTIFICATION

Course code : E3BE5QE3
ECTS : 1

DURATION

Lectures : 4
Tutorial classes : 12
Labs : 0
Total : 16

Project :
Personnal work :

ASSESSMENT

Minimum 2 continuous assessments.

TEACHING MATERIALS

Handout, Moodle

LANGUAGE

English

CONTACT

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Modifié le : 3 août 2026

UE : UE5.2-QEB

COURSE : Data Processing

SCOPE OF THE COURSE

OBJECTIVES

This course aims to equip student-engineers with the knowledge required to design experimental campaigns and analyze their results. They will be able to identify key factors and highlight main trends, while providing their results with information on the inherent uncertainty of this analysis.

COMPETENCE AND SKILLS

Build a linear or nonlinear model to explain and predict the variability of the endogenous variable.

Represent, analyze, and interpret the complexity of a large dataset using a simple one-dimensional or two-dimensional structure, i.e., identify what is analogous on the right side of the origin, on the left side, and concisely and accurately express the contrast between the two extremes.

Build a typology according to an ordered hierarchy and measure its quality.

Be able to conduct these analyses using specialized numerical tools : R, for example.

PROGRAM

- Multiple linear regression. Motivation. Examples. Descriptive approach. Affine dependence. Total, explained, and residual sum of squares. Multiple and simple regression coefficients. Probabilistic approach. Linear model. Estimation of regression coefficients and model standard deviation. Confidence intervals for coefficients. Global and marginal tests of coefficient nullity. Examples.
- Introduction to experimental design. Full factorial design. Example. Responses. Factors. Levels. Main effects and interaction effects. Representation. Iso-response curves. Response surfaces. Link with multiple regression.
- Principal Component Analysis. Review of vector analysis and matrix reduction. Motivation. Examples. Data tables. Fitting and analysis in the individuals' cloud. Inertia or variance explained by an affine subspace. Covariance matrix. Main diagonalization theorem. Interpretation. Fitting and analysis in the variables' cloud. Examples.
- Hierarchical ascending classification. Motivation. Typology and distance. Examples. General algorithm for hierarchical ascending classification. Dendrogram. Simple examples. Hierarchical ascending classification using Ward's variance criterion. Total variance, inter-class variance, intra-class variance. Quality of a typology. Examples.

BIBLIOGRAPHY

Husson, François, Sébastien Lê, and Jérôme Pagès. *Analyse de données avec R*. Presses universitaires de Rennes, 2016.

Goupy, Jacques. *Introduction aux plans d'expériences*. Dunod, 2017.

REQUIREMENTS

IDENTIFICATION

Course code : E3BE5QE4
ECTS : 0.5

DURATION

Lectures : 3
Tutorial classes : 9
Labs : 4
Total : 16

Project :
Personnal work :

ASSESSMENT

A Continuous Assessment Situational Assessment Role-playing Games

TEACHING MATERIALS

Course material

LANGUAGE

English

CONTACT

Modifié le : 3 août 2026

UE : UE5.2-QEB

COURSE : Interpersonal and intrapersonal communication

SCOPE OF THE COURSE

OBJECTIVES

Demonstrate the importance of intra- and interpersonal relationships in the work environment

COMPETENCE AND SKILLS

PROGRAM

- Definitions
- Personal and professional project
- Leadership and team cohesion
- Conflict management

BIBLIOGRAPHY

REQUIREMENTS

IDENTIFICATION

Course code : E3BE5QE5
ECTS : 2

DURATION

Lectures : 7
Tutorial classes : 21
Labs : 8
Total : 36

Project :
Personnal work :

ASSESSMENT

2 continuous assessments

TEACHING MATERIALS

Course support

LANGUAGE

English

CONTACT

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Modifié le : 3 août 2026

UE : UE5.2-QEB

COURSE : Fluid Mechanics

SCOPE OF THE COURSE

OBJECTIVES

The aim of this course is to establish balance equations and introduce the Navier-Stokes equations

COMPETENCE AND SKILLS

Know how to write balance equations, define the different types of flow, study viscous flows

PROGRAM

Generalized Bernoulli equation. Euler equations. Viscous flow. Introduction to the Navier-Stokes equation

BIBLIOGRAPHY

Fluid Mechanics
Sakir Amiroudine, Jean-Luc Battaglia

REQUIREMENTS

Fluid Mechanics courses CPI 1 and CPI 2

IDENTIFICATION

Course code : E3BE5QE6
ECTS : 1

DURATION

Lectures : 8
Tutorial classes : 24
Labs : 0
Total : 32

Project :
Personnal work :

ASSESSMENT

The UE is assessed through continuous assessments (CC) including written and oral exams, group evaluations (group work : integrating the APP approach) and individual evaluations. Group deliverables are required.

TEACHING MATERIALS

The UE includes theoretical courses, supervised practical work based on case studies, and individual assignments. The UE is supported by teaching materials (PPT, handouts, tables, abacuses, etc.) provided by the instructors.

LANGUAGE

English

CONTACT

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Modifié le : 3 août 2026

UE : UE5.2-QEB

COURSE : Mathematics Complements

SCOPE OF THE COURSE

OBJECTIVES

Review and revision of the mathematical tools necessary for a successful start to the Building and Energy engineering program.

COMPETENCE AND SKILLS

The skills targeted through the learning in this module are to :

- know the basics of theory and mathematical tools applied to the disciplinary field, particularly in mechanics (fluid and solid) and energetics (thermodynamics, mass and heat transfers)
- initiate modeling and problem-solving (simple and complex scientific problems)
- be able to analyze a dataset (linear or non-linear modeling methods, model validation, etc.)

PROGRAM

Common functions, differentiation and integration. Differential equations (basic review). Linear algebra, matrix algebra.

BIBLIOGRAPHY

REQUIREMENTS

IDENTIFICATION

Course code : E3BE5EF1
ECTS : 1.5

DURATION

Lectures : 6
Tutorial classes : 22
Labs : 8
Total : 36

Project :
Personnal work :

ASSESSMENT

- 2 Continuous Assessment (CA) grades -
1 Practical Work (PW) grade - Personal
Project grades

TEACHING MATERIALS

- Course and tutorial handouts - Past
exam papers - Home calculation tools

LANGUAGE

English

CONTACT

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Modifié le : 3 août 2026

UE : UE5.3-EFFI

COURSE : Energy Thermodynamics

SCOPE OF THE COURSE

OBJECTIVES

To be able to analyze and design an energy system

COMPETENCE AND SKILLS

After this course, students should be able to apply thermodynamics to energy systems

PROGRAM

- Introduction, principles and fundamental definitions
- Different forms of energy, first law of thermodynamics
- Fluids and their properties
- Energy analysis of closed systems
- Open systems (energy, mass and species conservation)
- Second law of thermodynamics
- Entropy and its use – Exergetic analysis
- Steam power cycles
- Gas power cycles
- Refrigeration cycles and heat pumps

BIBLIOGRAPHY

- Thermodynamique et optimisation énergétique des systèmes et procédés.
M. Feidt ISBN 2-85206-372-7
- Fundamentals of engineering thermodynamics (Moran J., Shapiro N.M. - 5th
ed. - 2006 – Wiley) ISBN-13 978-0-470-03037-0

REQUIREMENTS

Thermodynamics Cycle 1

IDENTIFICATION

Course code : E3BE5EF2
ECTS : 1

DURATION

Lectures : 2
Tutorial classes : 6
Labs : 4
Total : 12

Project :
Personnal work :

ASSESSMENT

- 1 Practical Work (PW) grade - Personal project grades

TEACHING MATERIALS

- Course and tutorial handouts - Manufacturer data - Site data - In-house calculation tools

LANGUAGE

English

CONTACT

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Modifié le : 3 août 2026

UE : UE5.3-EFFI

COURSE : Analysis of Building Flows

SCOPE OF THE COURSE

OBJECTIVES

To understand and identify the different flows (material, energy) present in buildings

COMPETENCE AND SKILLS

Upon completion of this course unit, the student will be able to :

1. Understand the fundamental principles of flow analysis in buildings;
2. Characterize the flows present in a building;
3. Analyze and aggregate flows;
4. Apply an analysis methodology to a building.

PROGRAM

- Introduction, principles and fundamental definitions
- The different flows present in a building, Units
- Aggregation of flows, definition of macro indicators
- Application to a tertiary, residential or industrial building

BIBLIOGRAPHY

- Incropera, F. P., DeWitt, D. P., Bergman, T. L., & Lavine, A. S. (2017). *Fundamentals of Heat and Mass Transfer*. John Wiley & Sons.
- ASHRAE (2021). *ASHRAE Handbook – Fundamentals*. American Society of Heating, Refrigerating and Air-Conditioning Engineers.
- ADEME (2022). *Guide to Energy Efficiency in Buildings*. ADEME Éditions.

REQUIREMENTS

This course unit requires basic knowledge in :

- thermodynamics and heat transfer;
- building physics;
- mass and energy balances;
- basic mathematical and statistical tools.

IDENTIFICATION

Course code : E3BE5EF3
ECTS : 1

DURATION

Lectures : 2
Tutorial classes : 6
Labs : 8
Total : 16

Project :
Personnal work :

ASSESSMENT

- 2 Practical Work (TP) grades - Personal project grades

TEACHING MATERIALS

- Course and tutorial handouts - Manufacturer data - In-house calculation tools

LANGUAGE

English

CONTACT

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Modifié le : 3 août 2026

UE : UE5.3-EFFI

COURSE : Programming for Building and Energy

SCOPE OF THE COURSE

OBJECTIVES

Implement, in the form of calculation tools, concepts covered in certain Building and Energy resources, such as : - Processing weather files - Modeling and simulating a solar water heater - Calculating a thermodynamic cycle - Calculating pressure losses ...

COMPETENCE AND SKILLS

PROGRAM

- Review of conservation, transfer, and state equations
- Introduction to programming
- Implementation during a practical work session

BIBLIOGRAPHY

REQUIREMENTS

IDENTIFICATION

Course code : E3BE5EF4
ECTS : 1

DURATION

Lectures : 0
Tutorial classes : 12
Labs : 0
Total : 12

Project :
Personnal work :

ASSESSMENT

Performance tracking and setting of personal goals.

TEACHING MATERIALS

Documentation

LANGUAGE

English

CONTACT

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Modifié le : 3 août 2026

UE : UE5.3-EFFI

COURSE : Sports

SCOPE OF THE COURSE

OBJECTIVES

This course aims to promote health, well-being, and the values of sports through the practice of varied physical activities, while strengthening students' ability to work in teams and push their limits. Through a variety of sports and cooperative games, students will be encouraged to develop essential interpersonal skills such as communication, collaboration, and leadership.

COMPETENCE AND SKILLS

- Communicate orally, adapting to the technical knowledge level of the audience
- Organize the project according to project management methodologies

PROGRAM

- Physical initiation and preparation
- Team sports and team spirit
- Individual sports and personal development
- Health and prevention

BIBLIOGRAPHY

- Jonny Wilkinson, *Memoirs of a Perfectionist*, 2012
- Mike Horn, *Wanting to Touch the Stars*, 2016
- Grégoire Chevignard, *From My Couch to the World's Toughest Race*, 2018

REQUIREMENTS

No prerequisites.

IDENTIFICATION

Course code : E3BE5EF5
ECTS : 1

DURATION

Lectures : 1
Tutorial classes : 3
Labs : 16
Total : 20

Project :
Personnal work :

ASSESSMENT

Continuous assessments Group work Re-ports

TEACHING MATERIALS

Course materials

LANGUAGE

English

CONTACT

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Modifié le : 3 août 2026

UE : UE5.3-EFFI

COURSE : Project Management

SCOPE OF THE COURSE

OBJECTIVES

The aim of this course is to provide an in-depth understanding of project management, covering its various phases from definition to closure, while emphasizing planning, risk management, team building, and operational monitoring.

COMPETENCE AND SKILLS

Be able to successfully lead a project as a project manager :

- Know how to define and negotiate the project objective.
- Know how to manage a project team.
- Know how to prepare the project (task breakdown, planning, identification of constraints and risks, cost assessment).
- Know how to execute the project (implementation, monitoring and control of risks/quality/costs; communication management; deadline tracking).
- Know how to close a project (delivery, team dismantling management, lessons learned).

PROGRAM

- Definitions (Project management, What is a project?, From idea to project, Characteristics of a project, Some remarks).
- The project management environment (Management, Steering, Planning, Execution, Project management objectives, Difficulties, Most common causes of failure).
- Project preparation

I. Defining the project in broad terms – The project charter

- The project (Brief definition, Essential characteristics, Reasons).
- Objectives (Technical objectives, Deadline objectives, Cost objectives, Objective hierarchy).
- The technique (Main difficulties, Contingency solution).
- The schedule (Brief) Key dates
- Resources (Human, Material).
- Project management (Project manager, Project team).
- Communication (Internal, External with suppliers)

II. Setting up the project team; III. Performing task breakdowns; IV. Identifying constraints and risks; V. Conducting planning; VI. Estimating costs.

- Project execution (implementation and monitoring)

I. Launching actions to start the project; II. Periodically analyzing progress; III. Carrying out necessary syntheses; IV. Applying corrective actions if necessary.

- Project closure

BIBLIOGRAPHY REQUIREMENTS

IDENTIFICATION

Course code : E3BE5EF6
ECTS : 2

DURATION

Lectures : 0
Tutorial classes : 0
Labs : 0
Total : 0

Project :
Personnal work :

ASSESSMENT

Oral defense grade (mid-term, final), written deliverable grade (school tutor), company grade

TEACHING MATERIALS

Academic materials, technical documents, specific resources,...

LANGUAGE

English

CONTACT

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Modifié le : 3 août 2026

UE : UE5.3-EFFI

COURSE : Project

SCOPE OF THE COURSE

OBJECTIVES

Engineering students carry out this project in pairs, under dual academic and company supervision. This work enables them to reflect on a concrete problem related to the building and energy specialization.

COMPETENCE AND SKILLS

- Learn to analyze the scope of the study through exchange.
- Be able to set up a framework and meet specifications (exchange on the company's needs and expectations).
- Identify needs.
- Identify and size equipment.
- Plan the work using a structured approach.
- Provide one or more solutions to the problem posed.
- Create a prototype (virtual or real) that meets the need.
- Write a technical and scientific report and present all project deliverables.

PROGRAM

- Learn to analyze the scope of the study through exchange.
- Be able to set up a framework and meet specifications (exchange on the company's needs and expectations).
- Identify needs.
- Identify and size equipment.
- Plan the work using a structured approach.
- Provide one or more solutions to the problem posed.
- Create a prototype (virtual or real) that meets the need.
- Write a technical and scientific report and present all project deliverables.

BIBLIOGRAPHY

REQUIREMENTS

IDENTIFICATION

Course code : E3BE5PR1
ECTS : 1

DURATION

Lectures : 3
Tutorial classes : 9
Labs : 0
Total : 12

Project :
Personnal work :

ASSESSMENT

1 continuous assessment grade

TEACHING MATERIALS

Course and TD booklet, Jupyter notebooks

LANGUAGE

English

CONTACT

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Modifié le : 3 août 2026

UE : UE5.4-PROEN

COURSE : Solar resource

SCOPE OF THE COURSE

OBJECTIVES

Students are able to calculate the coordinates of the sun's path in the sky and determine the solar energy received by any surface using a Python-based calculation code.

COMPETENCE AND SKILLS

Characterising a site's renewable energy potential

PROGRAM

The sun as a black body Solar radiation at ground level : Atmospheric composition, Absorption and scattering by the atmosphere, Components of ground-level radiation. Getting started with the pvlib library in a collaborative and online Python environment (Jupyter Notebook) Solar coordinates : Time references and the equation of time, Solar declination, hour angle, solar altitude and azimuth, Solar diagram. Radiation and energy incident on any surface

BIBLIOGRAPHY

Energie Solaire, J.B. Blaisot, Master GSI Maîtrise de l'Energie, Université de Rouen, 2010 Solar Engineering of Thermal Processes, J.A. Duffie and W.A. Beckman, 3rd Edition, John Wiley and Sons, USA, 2006 An introduction to Solar Radiation, M. Iqbal, Academic Press, Toronto, 1984 Gisement solaire et transferts énergétiques, A. Ricaud, Master Energies Renouvelables, Université de Cergy Pontoise, 2011 Workshop TwInSolar : Modelling individual components and a whole energy system, which integrates a large share of variable renewables - Part 1 : PV system modelling (<https://twinsolar.eu/en/online-workshops/>)

REQUIREMENTS

Heat transfer Programming for building and energy

IDENTIFICATION

Course code : E3BE5PR2
ECTS : 1

DURATION

Lectures : 8
Tutorial classes : 0
Labs : 20
Total : 28

Project :
Personnal work :

ASSESSMENT

Group assessment Individual assessment

TEACHING MATERIALS

Handouts, equipment

LANGUAGE

English

CONTACT

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Modifié le : 3 août 2026

UE : UE5.4-PROEN

COURSE : Innovation Methodology

SCOPE OF THE COURSE

OBJECTIVES

Students are able to develop an innovative prototype based on immersion tools, creativity, marketing, technical and economic feasibility, and project management while respecting the principles of sustainability.

COMPETENCE AND SKILLS

Analyze needs and context Identify opportunities (using functional analysis) Generate ideas and combine them into innovative products/services Analyze simple technical and financial feasibility

PROGRAM

- Research : inspiration and analysis
- Understanding user needs, ideation, prototyping, and testing.
- Teamwork : Effective collaboration, task distribution, and communication.
- Rapid prototyping : Creating mockups and functional prototypes.
- Problem-solving : Identifying and analyzing complex problems, mastering problem-solving tools, generating and selecting innovative solutions, developing an action plan
- Communication : Clear and persuasive presentation of ideas and solutions, responding to jury questions

BIBLIOGRAPHY

Design Sprint : A Practical Guidebook for Building Great Digital Products, Richard Banfield, Todd Lombardo, Trace Wax, 2015 Sprint, Jake Knapp, John Zeratsky, Braden Kowitz, 2016 Le Design Sprint en pratique, Pauline Thomas, 2020

REQUIREMENTS

Research and information monitoring tools (web...) Data management (sorting, storing files, backup and sharing tools...) Word processing tools Using spreadsheets (organizing, classifying, sorting, basic operations...) Using word processing software

IDENTIFICATION

Course code : E3BE5PR3
ECTS : 1

DURATION

Lectures : 3
Tutorial classes : 9
Labs : 0
Total : 12

Project :
Personnal work :

ASSESSMENT

1 to 2 continuous assessment grades

TEACHING MATERIALS

LANGUAGE

English

CONTACT

Sébastien HILAIRE
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Modifié le : 3 août 2026

UE : UE5.4-PROEN

COURSE : Report writing and documentation review

SCOPE OF THE COURSE

OBJECTIVES

Ability to integrate into and lead an organization, ability to communicate with specialists and non-specialists ; ability to find suitable bibliographic resources.

COMPETENCE AND SKILLS

PROGRAM

- Documentary research : university libraries, classification systems and types, databases, search equations, verifying online resources, formatting and referencing tools.
- Scientific writing : scientific writing standards, professional French, functional writing.
- Written communication and professional life : minutes, reports, technical reports, approaches to business communication through writing.
- Learning outcomes : Ability to write minutes ; ability to draft a bibliographic reference within a report.

BIBLIOGRAPHY

REQUIREMENTS

IDENTIFICATION

Course code : E3BE5PR4
ECTS : 3

DURATION

Lectures : 0
Tutorial classes : 20
Labs : 10
Total : 30

Project :
Personnal work :

ASSESSMENT

Internal assessment : Situational tasks
on professional skills Minimum 2 assess-
ments per semester External assessment :
TOEIC (S8/S9)

TEACHING MATERIALS

General English : Current affairs to-
pics, press, Internet Specialized En-
glish : Technical and scientific resources
Professional-focused English : CVs, cover
letters, emails TOEIC past papers

LANGUAGE

English

CONTACT

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Modifié le : 3 août 2026

UE : UE5.4-PROEN

COURSE : English

SCOPE OF THE COURSE

OBJECTIVES

This English-language course aims to develop pragmatic, sociocultural, and lin-
guistic skills aligned with the CEFR (<https://rm.coe.int/16802fc3a8>) across all
four language activities, using varied teaching methods in interactive lectures
(CM), tutorials (TD), and practical workshops (TP). Activities include listening
and reading comprehension, written production (essays, summaries, memos,
internship reports), and oral production (presentations, group projects, impro-
visations, discussions, and debates), preparing students for professional En-
glish use while fostering critical thinking.

COMPETENCE AND SKILLS

- Use technical documents in English
- Communicate orally and in writing, adapting to the technical knowledge level
of interlocutors
- Prepare for the TOEIC : Level 1 (B1.1)

PROGRAM

Documentary research : university libraries, classification systems, and

BIBLIOGRAPHY

- Authentic written and oral documents, Internet, television resources, foreign
press, digital tools, language-learning tools
- Global Exam, British Council, BBC Learning English, VoA, monolingual dic-
tionaries
- TOEIC past papers
- Websites of international and European organizations (general and specific) :
 - General : UN, WHO, WEF, IMF, WTO, World Bank...
 - Specific : IEEE, IETF, NIST, ENISA, NCSC...

REQUIREMENTS

CEFR Level B1

IDENTIFICATION

Course code : E3BE5PR5
ECTS :

DURATION

Lectures : 0
Tutorial classes : 4
Labs : 0
Total : 4

Project :
Personnal work :

ASSESSMENT

Presentation (support and oral) in English

TEACHING MATERIALS

Plans

LANGUAGE

English

CONTACT

Mathieu DAVID
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Modifié le : 3 août 2026

UE5.4-PROEN

SAÉ

SCOPE OF THE CHALLENGE

WORKING SITUATION

Design a photovoltaic solar installation installed on the roofs of a building with resale of the production

COMPETENCES AND LEVEL ASSESSED

EXPECTED OUTPUTS

RESOURCES

IDENTIFICATION

Course code : E3BE5PR6
ECTS : 1.5

DURATION

Lectures : 4
Tutorial classes : 16
Labs : 8
Total : 28

Project :
Personnal work :

ASSESSMENT

2 continuous assessment grades and 2 lab grades

TEACHING MATERIALS

Course booklets (lectures, tutorials, and labs), lab benches (IV analyzer)

LANGUAGE

English

CONTACT

Mathieu DAVID
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Modifié le : 3 août 2026

UE : UE5.4-PROEN

COURSE : Photovoltaics 1 : Technology and Sizing

SCOPE OF THE COURSE

OBJECTIVES

Students master the technical and environmental aspects related to a photovoltaic (PV) solar system used for electricity production resale. They are able to size the components of a simple PV system.

COMPETENCE AND SKILLS

Size a solar conversion system by selecting the technology suited to the customer's needs
Analyze the technical documentation of a solar project and write a technical report

PROGRAM

The solar energy market in the world and in Réunion Island Legislative framework, current and historical status Fundamentals on : - solar resource - PV modules - inverters - sizing of PV systems Site visit Sizing of grid-connected PV systems (resale and self-consumption) Energy yield calculation Return on investment calculation Safety aspects Sizing for off-grid systems Pumping with solar power Building integration

BIBLIOGRAPHY

Fédération de recherche du photovoltaïque, Le solaire photovoltaïque en France : réalité, potentiel et défis, <https://solairepv.fr> McEvoy, A., Markvart, T., and Luis, C. (2012). Practical Handbook of Photovoltaics. Elsevier. <https://doi.org/10.1016/C2005723-X> NREL (1995). Photovoltaic Fundamentals. <https://www.nrel.gov/docs/leg>

REQUIREMENTS

Heat transfer
Electricity
Solar resource

IDENTIFICATION

Course code : E3BE6ST1
ECTS : 2

DURATION

Lectures : 5
Tutorial classes : 11
Labs : 12
Total : 28

Project :
Personnal work :

ASSESSMENT

1 continuous assessment - 3 practical work sessions

TEACHING MATERIALS

course materials

LANGUAGE

English

CONTACT

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Modifié le : 3 août 2026

UE : UE6.1-STRUC

COURSE : Geotechnical Engineering

SCOPE OF THE COURSE

OBJECTIVES

students are able to design a foundation system and calculate it, interpret a soil study, know about retaining systems and their calculation methods, and interpret soil tests.

COMPETENCE AND SKILLS

Design a foundation based on geotechnical tests

PROGRAM

- Introduction to geology • Physical characteristics of soils • Stresses in soil - Terzaghi's law • Hydraulic behavior of soils • Soil settlement and consolidation • Shear strength of soils • Soil investigation, in-situ tests • Limit equilibrium theory - Application to active/passive earth pressure • Stability of retaining structures • Shallow and deep foundations

BIBLIOGRAPHY

Geotechnical Engineering Applied to Construction Projects

REQUIREMENTS

Mathematics; Isostatic structures.

IDENTIFICATION

Course code : E3BE6ST2
ECTS : 2

DURATION

Lectures : 7
Tutorial classes : 17
Labs : 0
Total : 24

Project :
Personnal work :

ASSESSMENT

1 continuous assessment

TEACHING MATERIALS

course material

LANGUAGE

English

CONTACT

Sébastien HILAIRE
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Modifié le : 3 août 2026

UE : UE6.1-STRUC

COURSE : Introduction to Building Digital Mock-ups

SCOPE OF THE COURSE

OBJECTIVES

Mastery of CAD software for representing 2D plans during project and execution phases (foundation plans, formwork plans), and 3D modeling of buildings or other Civil Engineering structures.

COMPETENCE AND SKILLS

Produce execution plans (foundation plans, formwork plans) at a precise scale

PROGRAM

• Introduction to AutoCAD • Introduction to drawing creation • Drawing, manipulation, and modification of basic shapes • Layer and property management • Drawing editing • Tracing simple objects • Text and hatching : layout • Display management • Basic dimensioning • Creating and inserting blocks with attributes • Image import • Paper layout and printing • Custom scale creation

BIBLIOGRAPHY

AutoCAD 2018 - 2D and 3D design, presentation - all advanced tools and features for professional projects

REQUIREMENTS

Construction materials; Construction techniques

IDENTIFICATION

Course code : E3BE6ST3
ECTS : 2.5

DURATION

Lectures : 9
Tutorial classes : 19
Labs : 12
Total : 40

Project :
Personnal work :

ASSESSMENT

2 continuous assessments - 3 practical work sessions

TEACHING MATERIALS

course material

LANGUAGE

English

CONTACT

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Modifié le : 3 août 2026

UE : UE6.1-STRUC

COURSE : Statically indeterminate structures

SCOPE OF THE COURSE

OBJECTIVES

students are able to calculate continuous beams, frames or statically indeterminate trusses according to the chosen method (particularly numerical methods)

COMPETENCE AND SKILLS

Preliminary sizing of statically indeterminate structural elements

PROGRAM

• Solving statically indeterminate problems • Study of continuous beams - Clapeyron formula (Three-moment equation) • Energy methods – Castigliano's, Ménabréa's, Bertrant de Fontviolant's, Muller-Breslau's, Pasternack's theorems • Displacement method (Stiffness matrix in global and local frames, matrix assembly, reduced matrix based on degrees of freedom; solving) • Trusses - iso-static and statically indeterminate articulated systems

BIBLIOGRAPHY

Mécanique des structures : Rappels de cours et applications, José Ouin, Castella

REQUIREMENTS

Statically determinate structures

IDENTIFICATION

Course code : E3BE6ST4
ECTS : 1

DURATION

Lectures : 0
Tutorial classes : 10
Labs : 0
Total : 10

Project :
Personnal work :

ASSESSMENT

At least two continuous assessments.

TEACHING MATERIALS

Slides and guided-work handouts.

LANGUAGE

English

CONTACT

Jean Jacques KADJO
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Modifié le : 3 août 2026

UE : UE6.1-STRUC

COURSE : LV2 or intensive English

SCOPE OF THE COURSE

OBJECTIVES

This course aims to develop students' linguistic, cultural, and communicative competencies in their second foreign language (Chinese or Spanish). It focuses on acquiring language fundamentals, oral and written fluency, and exploring associated cultures, to prepare students for interactions in personal, professional, or academic contexts.

COMPETENCE AND SKILLS

- Communicate with the various stakeholders involved (clients, management, users, IT managers, bodies – CNIL, ANSSI) in writing and orally
- Ensure appropriate communication with stakeholders, including clients, public authorities, citizens, and civil society

PROGRAM

1. Language initiation

- Basic grammatical constructions : present indicative, adjectives, pronouns.

2. Oral communication

- Techniques to improve pronunciation and oral fluency.

3. Written comprehension and expression

- Writing simple letters or emails (personal presentation, request for information).

4. Linguistic and intercultural deepening

- Study of songs, poems, or literary excerpts adapted to the level.

5. Practical project and continuous assessment

- Regular oral and written assessments to monitor progress.

BIBLIOGRAPHY

- ****Course title:**** Thermodynamics and Heat Transfer
- ****Course code:**** UE PHY 301
- ****Number of credits:**** 4 ECTS
- ****Year/Semester:**** 3rd year / 1st semester
- ****Category:**** Core course
- ****Prerequisites:**** PHY 201, MAT 201
- ****Instructor(s):**** [Name(s)]
- ****Contact:**** [Email]
- ****Course description:****

This course covers fundamental principles of thermodynamics and heat transfer.

- The first and second laws of thermodynamics
- Thermodynamic properties of pure substances
- Heat transfer mechanisms (conduction, convection, radiation)
- Steady-state and transient heat conduction
- Heat exchangers and thermal insulation
- Applications in engineering systems
- ****Learning outcomes:****
By the end of this course, students will be able to:
 1. Apply thermodynamic principles to analyze energy systems.
 2. Solve problems involving heat transfer in engineering contexts.
 3. Design and evaluate thermal systems using relevant tools and methods.
- ****Assessment methods:****
 - Continuous assessment: 40%
 - Practical work: 20%
 - Mid-term exam: 20%
 - Final exam: 60%
- ****Course content:****

Week	Topic	Activities
1	Introduction to Thermodynamics	Lecture, exercises
2	First Law of Thermodynamics	Lecture, problem-solving
3	Second Law of Thermodynamics	Lecture, case studies
4	Thermodynamic Properties of Pure Substances	Lab work
5	Heat Transfer Mechanisms	Lecture, demonstrations
6	Steady-State Heat Conduction	Problem-solving, lab work
7	Transient Heat Conduction	Lecture, simulations
8	Heat Exchangers	Design project
9	Thermal Insulation	Lecture, case studies
10	Applications in Engineering Systems	Guest lecture, group discussion
11	Review and Problem-Solving	Tutorial session
12	Final Exam Preparation	Review session
- ****Recommended readings:****
 - Cengel, Y. A., & Boles, M. A. (2019). *Thermodynamics: An Engineering Approach*
 - Incropera, F. P., & DeWitt, D. P. (2002). *Fundamentals of Heat and Mass Transfer*
- ****Additional resources:****
 - [Course Moodle page](#)
 - [Thermodynamics simulation software](#)

REQUIREMENTS

- ****Programme & Learning Outcomes****
 - ****UE 3.1.2 - Food Process Engineering****
 - ****ECTS Credits**:** 5
 - ****Hours**:** 50 h (20 h Lectures, 15 h Tutorials, 15 h Practical Work)
 - ****Teacher(s)**:** [Name]
 - ****Year/Semester**:** 3A S5
 - ****Prerequisites**:** UE 2.1.1 (Thermodynamics), UE 2.2.1 (Fluid Mechanics)
 - ****Description**:**
This course covers the fundamental principles of food process engineering.

- Thermal processing (pasteurization, sterilization)
- Drying and dehydration
- Separation processes (filtration, centrifugation)
- Mixing and emulsification
- Hygiene and safety standards (HACCP, ISO 22000)
- Sustainable process design and energy efficiency
- ****Assessment****:
 - Continuous assessment (40%): Practical work reports, quizzes
 - Final exam (60%): Written exam (2 h)
- ****Learning Outcomes****:
 - ****L01****: Apply heat and mass transfer principles to food processing
 - ****L02****: Design and optimize unit operations for food production.
 - ****L03****: Ensure compliance with hygiene and safety standards (HACCP)
 - ****L04****: Evaluate the environmental impact of food processes and
- ****Teaching Methods****:
 - Lectures with interactive problem-solving
 - Tutorials: Exercises and case studies
 - Practical work: Laboratory experiments and simulations
- ****Recommended Reading****:
 - [Author]. *Title*. Publisher, Year.
 - [Author]. *Title*. Publisher, Year.
- ****Additional Resources****:
 - [Link to online resources]
 - [Software tools: e.g., COMSOL, Aspen Plus]

IDENTIFICATION

Course code : E3B65QE1
ECTS : 2

DURATION

Lectures : 3
Tutorial classes : 9
Labs : 8
Total : 20

Project :
Personnal work :

ASSESSMENT

1 project grade + 1 continuous assessment grade

TEACHING MATERIALS

Handout

LANGUAGE

English

CONTACT

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Modifié le : 3 août 2026

UE : UE6.2-QEB

COURSE : Dynamic Thermal Simulation 1

SCOPE OF THE COURSE

OBJECTIVES

Master the aspects of Dynamic Thermal Simulation (DTS), i.e., know how to input the entire set of boundary and initial conditions and analyse the results and represent them

COMPETENCE AND SKILLS

After this course, students should be able to conduct an energy simulation of a multi-zone building using the EnergyPlus calculation code. They should also be able to present the results obtained in a report, including regulatory or incentive aspects (label).

PROGRAM

Multi-zone simulation and natural ventilation

- Multi-zone modelling (inter-zone and simplifying assumptions).
- Review of parameters influencing mass transfers at openings.
- Nodal models and natural ventilation models.
- Modelling natural ventilation : from simple to detailed models.
- Critical analysis of results.

Simulation and texts (regulations and labels)

- Complementarity between regulation and simulation.
- Examples with the PERENE framework.

Project

- Architectural optimization of a multi-zone building by applying a regulation or a label.
- Realistic simulation of user behaviour and systems to obtain an estimated consumption ratio for the building.
- Writing an study report.

BIBLIOGRAPHY

Energy simulation in building design. J.A. Clarke. Second Edition, Butterworth-Heinemann, Oxford, 2001.

REQUIREMENTS

IDENTIFICATION

Course code : E3B65QE2
ECTS : 2.5

DURATION

Lectures : 4
Tutorial classes : 12
Labs : 4
Total : 20

Project :
Personnal work :

ASSESSMENT

Case study on a building project in a defined city/country. Assessment will be based on a written report and an oral presentation. The final grade will be calculated as 2/3 written report + 1/3 oral presentation.

TEACHING MATERIALS

PowerPoint presentation.

LANGUAGE

English

CONTACT

François GARDE
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Modifié le : 3 août 2026

UE : UE6.2-QEB

COURSE : Bioclimatic Design and Comfort

SCOPE OF THE COURSE

OBJECTIVES

The aim of this course is to provide students with the working methods and tools to enable them to design low-environmental-impact buildings in tropical environments.

COMPETENCE AND SKILLS

- Identify passive design strategies (thermal inertia, natural ventilation, insulation, solar shading, etc.) based on climate type.
- Be able to draw inspiration from vernacular architecture to innovate and design future low-environmental-impact buildings.
- Be capable of designing passive buildings in tropical environments.

PROGRAM

COMFORT :

1. The different parameters involved in comfort : (air temperature, mean radiant temperature, air velocity, humidity, clothing, metabolism)
2. Resultant temperature and operative temperature
3. Givoni diagram
4. Adaptive comfort
5. Current standards (ISO 7730, ASHRAE Standard 55, EN15251)

SUSTAINABLE BUILDING DESIGN IN TROPICAL ENVIRONMENTS :

1. Units, energy ratios, primary energy, final energy
2. Key design principles in tropical environments
3. Building surroundings
4. Cross-ventilation
5. Solar shading (roof, opaque walls, glazing)
6. Energy efficiency of systems (air conditioning, ceiling fans, artificial lighting)
7. Building diagnostics (analysis of EDF bills, energy-consuming systems, proposed solutions and costing).

BIBLIOGRAPHY

UN-Habitat : Sustainable Architectural Design in Tropical Environments. Principles and Applications for East Africa. ISBN : 978-92-1-132573-7

<http://andrewmarsh.com/software/>

REQUIREMENTS

IDENTIFICATION

Course code : E3B65QE3
ECTS : 0

DURATION

Lectures : 0
Tutorial classes : 4
Labs : 0
Total : 4

Project :
Personnal work :

ASSESSMENT

Skills will be assessed based on the elements provided in the deliverable, which will be specified in advance to the engineering students.

TEACHING MATERIALS

All documents used during the teaching sessions or resources mobilized. If necessary, additional documentary references will be provided.

LANGUAGE

English

CONTACT

Modifié le : 3 août 2026

UE6.2-QEB

SAÉ

SCOPE OF THE CHALLENGE

WORKING SITUATION

Diagnose and assess needs and perform preliminary sizing of simple systems

COMPETENCES AND LEVEL ASSESSED

Eco-design and optimize buildings with low environmental impact

EXPECTED OUTPUTS

Conduct a survey and analyze the results

RESOURCES

- A professional
- QEB (Quality of the Built Environment) teacher
- APP (Active Pedagogical Project) teacher
- Teacher in engineering tools

IDENTIFICATION

Course code : E3B65QE4
ECTS : 1.5

DURATION

Lectures : 6
Tutorial classes : 20
Labs : 0
Total : 26

Project :
Personnal work :

ASSESSMENT

1 project grade + 1 continuous assessment grade

TEACHING MATERIALS

Course materials

LANGUAGE

English

CONTACT

Didier CALOGINE
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Modifié le : 3 août 2026

UE : UE6.2-QEB

COURSE : Mass and Heat Transfer

SCOPE OF THE COURSE

OBJECTIVES

After this course, students will be able to evaluate all phenomena and mechanisms of heat transfer by conduction, radiation, and convection.

COMPETENCE AND SKILLS

PROGRAM

- Introduction to modes of transfer
- Heat transfer
 - Conduction
 - Convection
 - Radiation
- Mass transfer by molecular diffusion and convection
 - Balance equations for a mixture
 - Typical diffusion problem

BIBLIOGRAPHY

REQUIREMENTS

IDENTIFICATION

Course code : E3B65QE5
ECTS : 0.5

DURATION

Lectures : 6
Tutorial classes : 0
Labs : 0
Total : 6

Project :
Personnal work :

ASSESSMENT

Individual assessment Oral presentation

TEACHING MATERIALS

Course materials

LANGUAGE

English

CONTACT

Fabrice DOUBLET
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Modifié le : 3 août 2026

UE : UE6.2-QEB

COURSE : TES 2 : New Economic and Governance Models

SCOPE OF THE COURSE

OBJECTIVES

This course aims to explore the transformations of economic models and governance practices in a context marked by environmental, social, and technological challenges.

COMPETENCE AND SKILLS

— Integrate the challenges of a just, equitable, and inclusive ecological transition

PROGRAM

— Historical influence of economic models on the sustainability of development
— Key emerging economic models supporting sustainable territorial development (collaborative economy, circular economy, functional economy, etc.)
— Main corporate governance models and their evolution — Impact of digital, social, and societal transformation on emerging governance models

BIBLIOGRAPHY

Sustainable territorial development : the path of the functional economy and cooperation – ADEME

REQUIREMENTS

IDENTIFICATION

Course code : E3B65QE6
ECTS : 1

DURATION

Lectures : 2
Tutorial classes : 12
Labs : 0
Total : 14

Project :
Personnal work :

ASSESSMENT

Individual assessment Oral presentation

TEACHING MATERIALS

Course materials TEC-Tec tool

LANGUAGE

English

CONTACT

Simon CHAUVAT
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Modifié le : 3 août 2026

UE : UE6.2-QEB

COURSE : TES 2 : LCA and Carbon Footprint

SCOPE OF THE COURSE

OBJECTIVES

This course aims to raise learners' awareness of carbon assessment methods for materials and products. Subsequently, they will also learn how to perform a carbon assessment on a building and find solutions to limit the carbon impact of construction activities.

COMPETENCE AND SKILLS

Eco-design and optimize low-impact buildings

PROGRAM

You work in a consultancy specializing in carbon studies, and an architect wants to optimize a housing project for which they are the project manager. Your task is to assess and advise this architect on reducing the carbon footprint of their building.

BIBLIOGRAPHY

PREBAT Réunion Guide, ADEME Resources, Philippe Bihouix

REQUIREMENTS

IDENTIFICATION

Course code : E3B65EF1
ECTS : 1

DURATION

Lectures : 0
Tutorial classes : 12
Labs : 0
Total : 12

Project :
Personnal work :

ASSESSMENT

Performance tracking and setting personal goals.

TEACHING MATERIALS

Documentation

LANGUAGE

English

CONTACT

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Modifié le : 3 août 2026

UE : UE6.3-EFFI

COURSE : Sports

SCOPE OF THE COURSE

OBJECTIVES

This course aims to promote health, well-being, and the values of sports through varied physical activities, while strengthening students' ability to work in teams and push their limits. Through a variety of sports and cooperative games, students will be encouraged to develop essential interpersonal skills such as communication, collaboration, and leadership.

COMPETENCE AND SKILLS

- Communicate orally, adapting to the technical knowledge level of the audience
- Organize the project according to project management methodologies

PROGRAM

- Physical initiation and preparation
- Team sports and team spirit
- Individual sports and personal development
- Health and prevention

BIBLIOGRAPHY

- Jonny Wilkinson, *Memoirs of a Perfectionist*, 2012
- Mike Horn, *Wanting to Touch the Stars*, 2016
- Grégoire Chevignard, *From My Couch to the World's Hardest Race*, 2018

REQUIREMENTS

No prerequisites.

IDENTIFICATION

Course code : E3B65EF2
ECTS : 2

DURATION

Lectures : 8
Tutorial classes : 24
Labs : 4
Total : 36

Project :
Personnal work :

ASSESSMENT

- In-class assignments - Homework assignments - Practical Work

TEACHING MATERIALS

- Course and TD handouts - Past exam papers - Home calculation tools

LANGUAGE

English

CONTACT

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Modifié le : 3 août 2026

UE : UE6.3-EFFI

COURSE : Climate Engineering

SCOPE OF THE COURSE

OBJECTIVES

To know how to size an air treatment network (production and distribution)

COMPETENCE AND SKILLS

Master the unit operations of air treatment. Master the calculation of pressure drops and the balancing of fluid networks.

PROGRAM

- Air treatment
 - Introduction/Context
 - Humid air
 - Thermodynamic properties
 - Psychrometric chart, construction and use
 - Unit operations (filtration, heating, cooling, humidification, dehumidification, mixing)
 - Load calculations (residential and industrial)
 - Air filtration and depollution
 - Conclusions, perspectives
- Distribution
 - Generalized Bernoulli equation
 - Isothermal flow, no heat exchanger
 - Presence of a heat exchanger or non-uniform temperature
 - Ideal fluid applications for flow measurement
 - Pitot tube
 - Venturi effect
 - Flow of real (Newtonian) fluids in pipes, pressure drops
 - Steady-state flow
 - Notion of pressure drop
 - Regular pressure drops
 - Non-cylindrical pipes
 - Singular pressure drops
- Network balancing
 - Case studies

BIBLIOGRAPHY

- RECNADEL-SPRENGER, *Manual of Climate Engineering*, PYC Edition, Paris, 1995
- ASHRAE Handbook : 1989 Fundamentals
- AICVF Guide, *Aeraulics : Principles of Aeraulics Applied to Climate Engineering*, PYC Edition, Paris, 1991
- IDELCHICK *Handbook of Hydraulic Resistance*

REQUIREMENTS

IDENTIFICATION

Course code : E3B65EF3
ECTS : 1

DURATION

Lectures : 1
Tutorial classes : 3
Labs : 8
Total : 12

Project :
Personnal work :

ASSESSMENT

Project-based learning (problem-solving)
Oral presentation Submission of a report

TEACHING MATERIALS

Course support (ppt) Case studies

LANGUAGE

English

CONTACT

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Modifié le : 3 août 2026

UE : UE6.3-EFFI

COURSE : Methodology for Problem Analysis and Resolution

SCOPE OF THE COURSE

OBJECTIVES

Master a set of methods and tools to analyze a situation for improvement and formalize an appropriate action plan.

COMPETENCE AND SKILLS

Know the main problem-solving methods and tools
Be able to describe a problem (QQOQCCP, PARETO)
Know how to analyze and identify the root causes of a problem (5M, 5 Whys, etc.)
Be able to generate and select ideas : brainstorming, decision matrix
Know how to develop and monitor an improvement action plan

PROGRAM

What is a problem?
Problem-solving methods : DMAIC, A3, 8D
Focus on the 8D method and associated tools
Brainstorming, QQOQCCP, PARETO, Cause-and-effect diagram, 5 Whys, fault tree, solution tree, decision matrix, weighted voting, GANTT, SMART objectives/indicators
Managing a working group (roles : facilitation, secretariat, time management, logistics)
Case study : in groups of 4/5 students

BIBLIOGRAPHY

Rémi Bachelet - MOOC MARP
<https://gestiondeprojet.pm/>

REQUIREMENTS

IDENTIFICATION

Course code : E3B65EF4
ECTS : 0

DURATION

Lectures : 0
Tutorial classes : 4
Labs : 0
Total : 4

Project :
Personnal work :

ASSESSMENT

Skills will be assessed based on the elements provided in the deliverable, which will be specified in advance to the engineering students.

TEACHING MATERIALS

All documents used during the teaching sessions or resources mobilized. If necessary, additional documentary references will be provided.

LANGUAGE

English

CONTACT

Modifié le : 3 août 2026

UE6.3-EFFI

SAÉ

SCOPE OF THE CHALLENGE

WORKING SITUATION

Diagnose and assess needs and perform preliminary sizing of simple systems

COMPETENCES AND LEVEL ASSESSED

1. Perform thermal, energy and carbon balances
2. Conduct an audit and analyze a consumption structure (environment, water, energy) in a tertiary, industrial or commercial sector
3. Select and pre-size appropriate systems
4. Understand regulatory frameworks and energy challenges (new construction/renovation)

EXPECTED OUTPUTS

- DELIVERABLES
 - Calculation sheet for balance
 - 1 Calculation sheet per pre-sizing
 - 1 Comparison tool
 - 1 Scenario analysis
 - Final written report
 - Presentation to the client

RESOURCES

- A professional (Client)
- Energy teacher
- Systems teacher
- Teacher in engineering tools

IDENTIFICATION

Course code : E3B65EF5
ECTS : 1.5

DURATION

Lectures : 6
Tutorial classes : 18
Labs : 4
Total : 28

Project :
Personnal work :

ASSESSMENT

- In-class assignments - Homework assignments - Practical work

TEACHING MATERIALS

- Course and tutorial handouts - Past exam papers - In-house calculation tools

LANGUAGE

English

CONTACT

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Modifié le : 3 août 2026

UE : UE6.3-EFFI

COURSE : Heat and Cold Production

SCOPE OF THE COURSE

OBJECTIVES

Master the heat and cold production cycles (analysis and sizing)

COMPETENCE AND SKILLS

Mastery of refrigeration and heating production applied to buildings.

PROGRAM

- Heat exchangers
 - Introduction
 - School exchangers (pure co-current and pure counter-current)
 - Industrial exchangers, sizing methods
 - LMTD method
 - Effectiveness - NTU method
 - Heat exchanger networks
- Refrigeration production
 - Introduction/Context
 - Refrigerants, diagrams
 - Mechanical vapor compression (single-stage, two-stage cycles)
 - Environmental and economic impacts
- Heat production
 - Introduction/Context
 - Boilers, heat pumps
 - Domestic hot water production

BIBLIOGRAPHY

- F. Meunier et al. *Froid industriel*, DUNOD, ISBN 978-2-10-0511404-5
- ASHRAE Handbook : 1989 Fundamentals
- *Echangeurs thermiques*. Jacques PADET. ISBN : 2-225-84256-6

REQUIREMENTS

IDENTIFICATION

Course code : E3B65EF6
ECTS : 2

DURATION

Lectures : 0
Tutorial classes : 0
Labs : 0
Total : 0

Project :
Personnal work :

ASSESSMENT

Oral defense grade (mid-term, final), written deliverable grade (school tutor), company grade

TEACHING MATERIALS

Academic materials, technical documents, specific resources, etc.

LANGUAGE

English

CONTACT

Jean CASTAING LASVIGNOTTES
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Modifié le : 3 août 2026

UE : UE6.3-EFFI

COURSE : Project

SCOPE OF THE COURSE

OBJECTIVES

Engineering students complete this project in pairs, under joint academic and industry supervision. This work enables them to address a real-world problem related to the building and energy specialization.

COMPETENCE AND SKILLS

- Learn to analyze the scope of the study in an exchange context.
- Be able to establish a framework and respond to a specifications document (exchange on the needs and expectations of the client's request)
- Identify needs
- Identify and size equipment.
- Plan work according to a structured approach.
- Provide one or more solutions to the problem posed
- Create a prototype (virtual or physical) that meets the need
- Write a technical and scientific report and be able to present all project deliverables

PROGRAM

- Learn to analyze the scope of the study in an exchange.
- Be able to establish a framework and respond to a specification (exchange on the needs and expectations of the company's order)
- Identify needs
- Identify and size equipment.
- Plan the work according to a structured approach.
- Provide one or more solutions to the problem posed
- Create a prototype (virtual or real) corresponding to the need
- Write a technical and scientific report and know how to present all project deliverables.

BIBLIOGRAPHY

REQUIREMENTS

IDENTIFICATION

Course code : E3B65PR1
ECTS : 2.5

DURATION

Lectures : 5
Tutorial classes : 15
Labs : 8
Total : 28

Project :
Personnal work :

ASSESSMENT

- In-class assignments - Homework assignments - Practical Work

TEACHING MATERIALS

- Course and tutorial handouts - Past exam papers - In-house calculation tools

LANGUAGE

English

CONTACT

Jean.CASTAING LAVIGNOTTES
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Modifié le : 3 août 2026

UE : UE6.4-PROEN

COURSE : Solar Thermal 1 : Technology and Sizing

SCOPE OF THE COURSE

OBJECTIVES

At the end of this course, students should master the technical, environmental, and regulatory aspects related to solar thermal renewable energies.

COMPETENCE AND SKILLS

To be able to analyze and size a solar thermal system

PROGRAM

- Solar Thermal
 - Technical aspects
 - Solar collector technology (flat plate, evacuated tube, unglazed)
 - Individual and collective solar domestic hot water (DHW) production systems
 - Environmental aspects
 - Benefits of solar energy, contribution of renewable energies
 - Energy bill, social and economic impact, Réunion-specific features
 - Regulations
 - Case studies from industry

BIBLIOGRAPHY

- Soteris A. Kalogirou. *Solar Energy Engineering. Processes and Systems*, 2nd Edition, 2013 ISBN : 9780123972569
- John A. Duffie, William A. Beckman. *Solar Engineering of Thermal Processes*, 4th Edition, 2013, ISBN : 978-0-470-87366-3

REQUIREMENTS

IDENTIFICATION

Course code : E3B65PR2
ECTS : 2

DURATION

Lectures : 4
Tutorial classes : 12
Labs : 8
Total : 24

Project :
Personnal work :

ASSESSMENT

1 project grade + 1 continuous assessment grade

TEACHING MATERIALS

Academic materials, technical documents, specific resources,...

LANGUAGE

English

CONTACT

David THERINCOURT
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Modifié le : 3 août 2026

UE : UE6.4-PROEN

COURSE : Electrical Conversion

SCOPE OF THE COURSE

OBJECTIVES

To acquire mastery of knowledge and practices for overseeing projects related to the distribution, use, and conversion of electrical energy in Low Voltage (LV) systems.

COMPETENCE AND SKILLS

After this course, students should be able to determine electrical quantities and justify equipment selection in an LV installation.

PROGRAM

- Electricity
 - Electrical fundamentals
 - Power quality
 - Electrical power
 - Three-phase alternating current circuits
 - Circuits under distorted conditions
 - Electrical networks
 - Protection of property and persons
 - Short-circuit current calculations
 - Excerpts from standards and schematic design rules
- Electrotechnics
 - Magnetic circuits and transformers
 - Alternators, synchronous and asynchronous machines

BIBLIOGRAPHY

Technical handbooks, Schneider Electric Electrotechnics. L. Lasne (Dunod 2008)
Electrical and electronic technology. Hughes (Pearson 2008) tenth edition NF C15-100 standard AFNOR Electrosystems. H. Ney (Nathan Technique 1996)

REQUIREMENTS

IDENTIFICATION

Course code : E3B65PR3
ECTS : 3

DURATION

Lectures : 0
Tutorial classes : 20
Labs : 10
Total : 30

Project :
Personnal work :

ASSESSMENT

Internal assessment : Practical exercise on professional skills Minimum of 2 assessments per semester External assessment : TOEIC (S8/S9)

TEACHING MATERIALS

General English : Current events, press, Internet Specialized English : Technical and scientific resources Professional-oriented English : CV, cover letter, email TOEIC past papers

LANGUAGE

English

CONTACT

Edel LYNCH
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Modifié le : 3 août 2026

UE : UE6.4-PROEN

COURSE : English

SCOPE OF THE COURSE

OBJECTIVES

This course, taught in English, aims to develop pragmatic, sociocultural, and linguistic competencies aligned with the CEFR across the four language skills, through varied teaching methods in interactive lectures, tutorials, and practical labs. Activities include listening and reading comprehension, written productions (essays, summaries, memos, internship reports) and oral productions (presentations, group projects, improvisations, discussions, and debates), preparing students for professional English use while fostering critical thinking.

COMPETENCE AND SKILLS

- Use technical documents in English
- Communicate orally and in writing, adapting to the technical knowledge level of interlocutors
- Argue, explain, persuade, and nuance orally
- Prepare for the TOEIC : Level 2 (B1.2)

PROGRAM

- Understanding written and oral documents
- Writing a synthesis based on a series of oral and written documents
- Interaction, discussion, defending a point of view, debate
- Grammatical correction – advanced syntax, level 1 linking words, argumentative structures
- English rhythm and prosody
- Level 1 formal register

BIBLIOGRAPHY

- Authentic written and oral documents, Internet, television resources, foreign press, digital tools, language-learning tools
- Global Exam, British Council, BBC Learning English, VoA, monolingual dictionaries
- TOEIC past papers
- Websites of general and specific international and European organizations :
 - General : UN, WHO, WEF, IMF, WTO, World Bank...
 - Specific : IEEE, IETF, NIST, ENISA, NCSC...

REQUIREMENTS

Level B1.1 CEFR

IDENTIFICATION

Course code : E3B65PR4
ECTS : 0

DURATION

Lectures : 0
Tutorial classes : 0
Labs : 0
Total : 0

Project :
Personnal work :

ASSESSMENT

Regular individual meetings with a designated tutor teacher

TEACHING MATERIALS

Competency framework for the specialization Deliverables from SAE (Situational Learning Activities) IT tool supporting the portfolio

LANGUAGE

English

CONTACT

Sébastien HILAIRE
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Modifié le : 3 août 2026

UE : UE6.4-PROEN

COURSE : Portfolio

SCOPE OF THE COURSE

OBJECTIVES

The objective of this course is to support the engineering student in building their competency portfolio throughout their time at the school, in order to develop their profile in line with their professional project.

COMPETENCE AND SKILLS

Develop the ability to self-assess, manage one's skills (particularly with a view to lifelong learning), and make professional choices

PROGRAM

- Understanding the competency-based approach and the portfolio tool
- Importing evidence elements (traces) validating the competency level achieved in the first year of the engineering cycle
- Reflection on the professional project : in which competency(ies) the engineering student wishes to build their career
- Potential valorization of extracurricular activities
- Construction of the professional project (S5, 30 min)

BIBLIOGRAPHY

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REQUIREMENTS

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IDENTIFICATION

Course code : ESI-SPI-CI-BE4-S7-UE3-EC1
ECTS : 1

DURATION

Lectures : 8
Tutorial classes : 12
Labs : 0
Total : 20

Project :
Personnal work :

ASSESSMENT

- In-class assignments - Homework assignments - Practical work

TEACHING MATERIALS

- Course and tutorial handouts - Past exam papers - In-house calculation tools

LANGUAGE

English

CONTACT

Jean.CASTAING LAVIGNOTTES
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Modifié le : 3 août 2026

UE : UE7-EFFI

COURSE : Energy Storage

SCOPE OF THE COURSE

OBJECTIVES

Design and analyze complex energy systems

COMPETENCE AND SKILLS

Mastery of complex energy systems

PROGRAM

- Energy storage systems
 - Energy loads
 - Storage and various storage methods
 - Mechanical storage
 - Magnetic storage
 - Thermal storage
 - Hydrogen storage
- Comparison of different techniques

BIBLIOGRAPHY

- L. Borel *Thermodynamics and Energetics*
- M. Feidt. *Energetics*, DUNOD ISBN 2 10 049066 4
- *Traité de Génie Civil* from the École Polytechnique Fédérale de Lausanne, volume 21 : *Energy Systems* ISBN-13 : 978-2880744649

REQUIREMENTS

- Thermodynamics
- Heat and cold production
- Fluid mechanics
- Heat transfer

IDENTIFICATION

Course code : ESI-SPI-CI-BE4-S7-UE3-EC2
ECTS : 1

DURATION

Lectures : 8
Tutorial classes : 8
Labs : 4
Total : 20

Project :
Personnal work :

ASSESSMENT

- In-class assignments - Homework assignments - Practical work

TEACHING MATERIALS

- Course and tutorial handouts - Past exam papers - In-house calculation tools

LANGUAGE

English

CONTACT

Jean.CASTAING LAVIGNOTTES
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Modifié le : 3 août 2026

UE : UE7-EFFI

COURSE : Cogeneration and Innovative Energy Systems

SCOPE OF THE COURSE

OBJECTIVES

Design and analyze complex energy systems

COMPETENCE AND SKILLS

Mastery of complex energy systems

PROGRAM

- Cogeneration and trigeneration systems
 - Work-producing cycles (gas turbine and steam cycle)
 - Tri-thermal cycles (absorption and adsorption)
 - Case study
- Comparison of different techniques

BIBLIOGRAPHY

- L. Borel Thermodynamics and Energetics
- M. Feidt. Energetics, DUNOD ISBN 2 10 049066 4
- Civil Engineering Treatise from the Swiss Federal Institute of Technology Lausanne, volume 21 : Energy Systems ISBN-13 : 978-2880744649

REQUIREMENTS

- Thermodynamics
- Refrigeration and heat production
- Fluid mechanics
- Heat transfer

IDENTIFICATION

Course code : ESI-SPI-CI-BE4-S7-UE3-EC3
ECTS : 2

DURATION

Lectures : 4
Tutorial classes : 0
Labs : 16
Total : 20

Project :
Personnal work :

ASSESSMENT

Deliverables and presentations

TEACHING MATERIALS

Mission support materials, data, guides, reports...

LANGUAGE

English

CONTACT

Khalid ADDI

Modifié le : 3 août 2026

UE : UE7-EFFI

COURSE : Innovation competition

SCOPE OF THE COURSE

OBJECTIVES

This course aims to develop students' ability to successfully carry out, in groups (7 to 12 students), an innovation project involving problem-solving, continuous improvement, or the design of new breakthrough solutions, while taking sustainability challenges into account.

COMPETENCE AND SKILLS

mobilize and combine the tools related to innovation methodology acquired in the resources, learn to learn (complementing the tools...), work in a project group (shared reflexivity, autonomy, time and stress management...), communicate and convince

PROGRAM

Upstream innovation : State of the art, market study, regulations, market immersion, opportunities, defining objectives, initiating ideation

BIBLIOGRAPHY

According to the year project

REQUIREMENTS

Project management, survey management, marketing, and creativity methods. These prerequisites are acquired beforehand through curriculum resources or during the academic year through self-directed or guided learning.

IDENTIFICATION

Course code : ESI-SPI-CI-BE4-
S7-UE3-EC4
ECTS : 1

DURATION

Lectures : 8
Tutorial classes : 8
Labs : 0
Total : 16

Project :
Personnal work :

ASSESSMENT

At least 2 continuous assessments.

TEACHING MATERIALS

Course materials

LANGUAGE

English

CONTACT

Jean Jacques KADJO Lecturer : Anasthase
TANGAMOUTOU
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Modifié le : 3 août 2026

UE : UE7-EFFI

COURSE : General Accounting

SCOPE OF THE COURSE

OBJECTIVES

The aim of this course is to provide learners with the fundamentals of general accounting, covering routine transactions, inventory, and the preparation of financial statements.

COMPETENCE AND SKILLS

Ability to consider the company's challenges; ability to communicate with accounting specialists.

Knowledge of the main accounting documents and their framework of use.

Understanding of the principles and methods of general accounting.

PROGRAM

- Basic general accounting.
- Routine transactions.
- Inventory.
- Financial statements.

BIBLIOGRAPHY

REQUIREMENTS

None

IDENTIFICATION

Course code : ESI-SPI-CI-BE4-S7-UE3-EC5
ECTS : 0.5

DURATION

Lectures : 8
Tutorial classes : 0
Labs : 0
Total : 8

Project :
Personnal work :

ASSESSMENT

1 "Research Memo" (1 to 2 pages max).
Based on a given technical topic, the student must find two reliable sources, cite them correctly, and formulate an associated research problem.

TEACHING MATERIALS

LANGUAGE

English

CONTACT

Mathieu DAVID
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Modifié le : 3 août 2026

UE : UE7-EFFI

COURSE : Introduction to Research

SCOPE OF THE COURSE

OBJECTIVES

Differentiating the engineer's approach from the researcher's approach : Understanding when a standard solution is no longer sufficient and scientific investigation is required.

Mastering reliable information research : Knowing how to identify a high-value scientific source (avoiding web "noise").

Structuring reflection : Knowing how to pose a clear problem in the face of a complex phenomenon (e.g., thermal behavior of a new material).

COMPETENCE AND SKILLS

Extracting the essential from a publication : Reading a scientific article "efficiently" (Abstract, Conclusion, Figures) without getting lost.

Citing sources : Avoiding plagiarism and respecting intellectual property in technical reports.

Arguing with evidence : Supporting technical choices with sourced and verified data.

PROGRAM

Session 1 (4h) : Scientific posture and monitoring

The Engineer and R&D : Why research is essential in tropical construction (material innovation, energy storage).

"Fast-Checking" Workshop : Research on Google Scholar / Rapid documentary monitoring techniques.

Intellectual Property : The basics of patents and copyright.

Session 2 (4h) : Methodology and Analysis

From the question to the problem : Practical exercise on a Building/Energy topic.

Critical reading : Collective analysis of a case study (e.g., performance test on a bio-based insulator in Réunion).

Synthesis : How to write a concise state of the art.

BIBLIOGRAPHY

REQUIREMENTS

IDENTIFICATION

Course code : ESI-SPI-CI-BE4-
S7-UE3-EC6
ECTS : 2

DURATION

Lectures : 2
Tutorial classes : 0
Labs : 0
Total : 2

Project :
Personnal work :

ASSESSMENT

Oral defense grade (mid-term, final), written deliverable grade (school tutor), company grade

TEACHING MATERIALS

Academic materials, technical documents, specific resources, etc.

LANGUAGE

English

CONTACT

Mathieu DAVID
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Modifié le : 3 août 2026

UE : UE7-EFFI

COURSE : Project

SCOPE OF THE COURSE

OBJECTIVES

Engineering students complete this project in pairs, under dual academic and company supervision. This work enables them to address a concrete problem related to the building and energy specialization.

COMPETENCE AND SKILLS

- Learn to analyze the scope of the study through exchange.
- Be able to establish a framework and meet specifications (exchange on the needs and expectations of the company's request).
- Identify needs.
- Identify and size equipment.
- Plan the work using a structured approach.
- Provide one or more solutions to the problem posed.
- Create a prototype (virtual or real) that meets the need.
- Write a technical and scientific report and present all project deliverables.

PROGRAM

- Learn to analyze the scope of the study through exchange.
- Be able to establish a framework and meet specifications (exchange on the needs and expectations of the company's request).
- Identify needs.
- Identify and size equipment.
- Plan the work using a structured approach.
- Provide one or more solutions to the problem posed.
- Create a prototype (virtual or real) that meets the need.
- Write a technical and scientific report and present all project deliverables.

BIBLIOGRAPHY

REQUIREMENTS

None

IDENTIFICATION

Course code : ESI-SPI-CI-BE4-S7-UE4-EC1
ECTS : 2

DURATION

Lectures : 8
Tutorial classes : 12
Labs : 0
Total : 20

Project :
Personnal work :

ASSESSMENT

Minimum 2 continuous assessments

TEACHING MATERIALS

Course material (ppt)

LANGUAGE

English

CONTACT

Khalid Addi Instructor : Aline SCRIVA

Modifié le : 3 août 2026

UE : UE7-PROEN

COURSE : Logistics Systems

SCOPE OF THE COURSE

OBJECTIVES

The aim of this course is to equip learners with the necessary skills to model and optimize production units, covering key concepts such as Petri nets, linear algebra, competitiveness, inventory management, Lean manufacturing, and scheduling methods, while taking into account the specificities of island-based enterprises.

COMPETENCE AND SKILLS

Ability to consider company challenges from a production management perspective Ability to model production units in Petri net formalism as well as their integration into a supply chain. Manage internal manufacturing orders and customer/supplier orders (kanbans) within this formalism (introduction to ERP systems).

Provide engineering students with the necessary foundations for managing a production unit with a Lean manufacturing / Lean management approach.

PROGRAM

- Study of Petri nets, properties, invariants, and linear algebra. Modeling production units, significance of invariants for inventory and work-in-progress control.
- The company : regional, European, and global context.
- Competitiveness : productivity and innovation – Key performance indicators.
- Master Production Schedule (MPS), Production Planning (PP), Production Execution (PE), net requirements, gross requirements.
- Inventory and procurement management – specificities of island-based enterprises.
- Push and pull flows, MRP, Just-in-Time.
- Lean manufacturing, customer value-added, and Lean management.
- Lean tools (5S, 3M, 6 sigma, SMED, Kaizen, Kanban, Poka-Yoke, TSP, etc.).
- Some scheduling methods.

BIBLIOGRAPHY

REQUIREMENTS

IDENTIFICATION

Course code : ESI-SPI-CI-BE4-
S7-UE4-EC2
ECTS : 2.5

DURATION

Lectures : 4
Tutorial classes : 8
Labs : 0
Total : 12

Project :
Personnal work :

ASSESSMENT

1 continuous assessment grade

TEACHING MATERIALS

Course and TD booklet, Jupyter notebooks

LANGUAGE

English

CONTACT

Mathieu DAVID
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Modifié le : 3 août 2026

UE : UE7-PROEN

COURSE : Photovoltaics 2 : Modelling and Performance Indicators

SCOPE OF THE COURSE

OBJECTIVES

Model and simulate the energy production of a PV installation. Estimate performance indicators. Understand the contribution of parameters influencing performance.

COMPETENCE AND SKILLS

- Adapt to technical constraints related to the site (ZNI, etc.)
- Design a hybrid production system

PROGRAM

Modelling of POA irradiance Modelling of PV array Modelling of inverters Modelling of PV systems with the PVWatts model

BIBLIOGRAPHY

<https://pvlib-python.readthedocs.io/en/stable/>

REQUIREMENTS

Photovoltaics 1 : technology and sizing Electrical conversion Solar resource

IDENTIFICATION

Course code : ESI-SPI-CI-BE4-
S7-UE4-EC3
ECTS : 0

DURATION

Lectures : 4
Tutorial classes : 0
Labs : 0
Total : 4

Project :
Personnal work :

ASSESSMENT

Presentation (support and oral) in English

TEACHING MATERIALS

Plans

LANGUAGE

English

CONTACT

Mathieu DAVID
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Modifié le : 3 août 2026

UE7-PROEN

SAE

SCOPE OF THE CHALLENGE

WORKING SITUATION

Design a hybrid renewable energy (EnR) installation and determine its economic and environmental performance

COMPETENCES AND LEVEL ASSESSED

EXPECTED OUTPUTS

RESOURCES

Photovoltaic 1 : Technology and sizing Solar thermal 1 : Technology and sizing,
Electrical conversion Solar resource Energy storage

IDENTIFICATION

Course code : ESI-SPI-CI-BE4-
S7-UE4-EC4
ECTS : 3

DURATION

Lectures : 0
Tutorial classes : 20
Labs : 10
Total : 30

Project :
Personnal work :

ASSESSMENT

2 Continuous Assessments + 1 oral presentation + an average of homework assignments + a mock TOEIC test.

TEACHING MATERIALS

Adaptive and varied materials tailored to skill levels.

LANGUAGE

English

CONTACT

Edel LYNCH
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Modifié le : 3 août 2026

UE : UE7-PROEN

COURSE : English

SCOPE OF THE COURSE

OBJECTIVES

Deepen oral comprehension strategies : authentic documents and TOEIC practice.

Structure technical written discourse – 500 words.

COMPETENCE AND SKILLS

Oral comprehension.

Written expression.

PROGRAM

Pragmatic competence :

Interactive oral communication through relevant tasks.

Writing a scientific and technical report (Project : study trip).

Technical video summary : cross-disciplinary skills.

Sociolinguistic competence :

Language register : scientific English.

American register and various accents – Different Englishes.

Linguistic competence :

Vocabulary : technical and scientific lexical field.

Business English : meetings, orders, invoicing, deliveries.

Phonology : specific English phonemes across regions.

Rhythm : sentence stress, prosody.

Grammar : verb phrases – mastering grammatical analysis of English sentences.

Complex sentences, idiomatic expressions.

BIBLIOGRAPHY

Online Cambridge/Oxford Dictionary.

The British Council : Learn grammar.

TOEIC past papers.

Current affairs topics, English press : The Guardian, TED, BBC, CNN, VoA.

REQUIREMENTS

Level B2 in progress.

IDENTIFICATION

Course code : ESI-SPI-CI-BE4-S7-UE2-EC1
ECTS : 1

DURATION

Lectures : 4
Tutorial classes : 8
Labs : 4
Total : 16

Project :
Personnal work :

ASSESSMENT

The final grade includes : - Continuous assessment - POE lab work grade

TEACHING MATERIALS

PowerPoint presentations

LANGUAGE

English

CONTACT

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Modifié le : 3 août 2026

UE : UE7-QEB

COURSE : Survey Management and Occupancy Mode Evaluation

SCOPE OF THE COURSE

OBJECTIVES

The objectives of this course are :
To know how to conduct an evaluation in occupancy mode.

COMPETENCE AND SKILLS

To be able to conduct an occupancy mode evaluation of buildings (assessment of energy performance and thermal comfort).

PROGRAM

POST OCCUPANCY EVALUATION :

- Presentation of various POE methods.
- Case study on several existing buildings.

PRACTICAL WORK :

- Occupancy mode evaluation of a positive-energy building. Comfort questionnaires are completed by users. Concurrently, comfort conditions are measured in classrooms and offices.
- Monitoring of energy consumption and analysis of a positive-energy building by usage type.

BIBLIOGRAPHY

Garde F. et al (2017). Solution Sets for Net-Zero Energy Buildings : Feedback from 30 Buildings worldwide. Wiley and son. ISBN :9783433030721

REQUIREMENTS

- S6 - Heat transfers. Thermal load balance of a building. Comfort and design in tropical environments. Sketchup.
- S8 - Software tools in energy simulation. Solar Renewable Energy.
- S9 - Software tools in energy simulation 2.

IDENTIFICATION

Course code : ESI-SPI-CI-BE4-S7-UE2-EC2
ECTS : 1

DURATION

Lectures : 4
Tutorial classes : 12
Labs : 0
Total : 16

Project :
Personnal work :

ASSESSMENT

1 project grade

TEACHING MATERIALS

PowerPoint presentations, EnergyPlus package, plans

LANGUAGE

English

CONTACT

Simon CHAUVAT
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Modifié le : 3 août 2026

UE : UE7-QEB

COURSE : Dynamic Thermal Simulation 2

SCOPE OF THE COURSE

OBJECTIVES

Design of buildings with natural ventilation and mixed-mode systems

COMPETENCE AND SKILLS

After this course, students should be able to conduct an energy simulation of a multi-zone building using the EnergyPlus calculation code. They should also be able to present the results obtained in a report, including regulatory or incentive aspects (label).

PROGRAM

Part I : Multi-zone simulation and natural ventilation - Multi-zone modeling (inter-zone and simplifying assumptions) - Review of parameters influencing mass transfers at openings - Nodal models and natural ventilation models - Natural ventilation modeling : from simple to detailed models - Critical analysis of results

Part II : Simulation and regulations (regulations and labels) - Complementarity between regulation and simulation - Examples with the PERENE framework

Part III : Project - Architectural optimization of a multi-zone building by applying a regulation or a label - Realistic simulation of user behavior and systems to obtain an estimated consumption ratio for the building - Writing a study report

BIBLIOGRAPHY

Energy simulation in building design. J.A. Clarke. Second Edition, Butterworth-Heinemann, Oxford, 2001. EnergyPlus version 8 manual

REQUIREMENTS

Heat transfer, modeling tools (introduction to EnergyPlus or equivalent)

IDENTIFICATION

Course code : ESI-SPI-CI-BE4-S7-UE2-EC3
ECTS : 3

DURATION

Lectures : 22
Tutorial classes : 0
Labs : 0
Total : 22

Project :
Personnal work :

ASSESSMENT

2 individual grades (SST, CSR/Ethics) 2
project grades (CSR/Ethics)

TEACHING MATERIALS

Course materials Regulations and standards

LANGUAGE

English

CONTACT

Fabrice DOUBLET
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Modifié le : 3 août 2026

UE : UE7-QEB

COURSE : TES 3 : SST, CSR, Engineering Ethics

SCOPE OF THE COURSE

OBJECTIVES

— Identify and assess risks to health and safety at work and contribute to the company's prevention process — Be able to develop, implement and improve a Corporate Social Responsibility (CSR) approach within a company — Develop an ethical and responsible professional practice, taking societal issues into account

COMPETENCE AND SKILLS

— Conduct an appropriate diagnosis for the issue at hand — Collect internal and external environmental data for the project and analyze a site — Understand the building production chain

PROGRAM

Part 1 : Health and Safety at Work — Definitions and stakes (human, economic and legal) and statistics on work-related accidents and illnesses — Regulations and general principles of prevention — Roles and responsibilities of health and safety professionals — Assessment of occupational risks and Single Document (DUER) — Main hazards and prevention measures — Practical application : risk assessment using Tutoprev

Part 2 : Corporate Social Responsibility (CSR) — History of sustainable development / CSR and stakes at global, national and regional levels — Implementing a CSR approach in a company (ISO 26000, ISO 53001) — Identifying relevant SDGs / action areas and prioritizing action plans

Part 3 : Engineering Ethics — Concepts of professional ethics for engineers — Methodology for resolving an ethical dilemma

BIBLIOGRAPHY

— French Labour Code — Annual reports from the French National Health Insurance Fund (Assurance Maladie) — INRS, OPPBTP, ANACT-ARACT network websites and documentation — The Sustainable Development Goals Reports — Réunion SDG progress reports : analysis of indicator trends over the past 20 years (DEAL Réunion) — AFNOR NF EN ISO 26000 (2010) — ISO 53001 Management systems for sustainable development goals (SDGs) — WFEO Code of Ethics (2023-10-06) — Engineers and Scientists of France Ethical Charter

REQUIREMENTS

General knowledge of business management

IDENTIFICATION

Course code : ESI-SPI-CI-BE4-S7-UE2-EC4
ECTS : 1

DURATION

Lectures : 0
Tutorial classes : 12
Labs : 0
Total : 12

Project :
Personnal work :

ASSESSMENT

Performance tracking and setting personal goals.

TEACHING MATERIALS

Documentation

LANGUAGE

English

CONTACT

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Modifié le : 3 août 2026

UE : UE7-QEB

COURSE : Sports

SCOPE OF THE COURSE

OBJECTIVES

This course aims to promote health, well-being, and the values of sports through varied physical activities, while strengthening students' ability to work in teams and push their limits. Through a variety of sports and cooperative games, students will be encouraged to develop essential interpersonal skills such as communication, collaboration, and leadership.

COMPETENCE AND SKILLS

- Communicate orally, adapting to the technical knowledge level of the audience
- Organize the project according to project management methodologies

PROGRAM

- Physical initiation and preparation
- Team sports and team spirit
- Individual sports and personal development
- Health and prevention

BIBLIOGRAPHY

- Jonny Wilkinson, *Memoirs of a Perfectionist*, 2012
- Mike Horn, *Wanting to Touch the Stars*, 2016
- Grégoire Chevignard, *From My Couch to the World's Hardest Race*, 2018

REQUIREMENTS

No prerequisites.

IDENTIFICATION

Course code : ESI-SPI-CI-BE4-S7-UE2-EC5
ECTS : 1

DURATION

Lectures : 16
Tutorial classes : 8
Labs : 4
Total : 28

Project :
Personnal work :

ASSESSMENT

2 continuous assessment grades

TEACHING MATERIALS

PowerPoint presentation and handout

LANGUAGE

English

CONTACT

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Modifié le : 3 août 2026

UE : UE7-QEB

COURSE : Regulations on disability and fire safety

SCOPE OF THE COURSE

OBJECTIVES

Introduction to regulations and technical barriers Application of French regulations on accessibility for persons with disabilities in buildings

COMPETENCE AND SKILLS

Mastery of technical aspects and application of fire safety regulations

PROGRAM

- Fire risk in buildings.
- Technical solutions to mitigate fire risk.
- Current regulatory texts.
- Application to real building cases.
- Disability and building ergonomics.
- Technical solutions for accessibility for persons with disabilities.
- Current regulatory texts.
- Application to real building cases.

BIBLIOGRAPHY

Commented fire safety regulations for public establishments (ERP) General provisions - technical instructions Authors : Socotec, Laurent Van Hinte, Thierry Kremer Publisher : Le Moniteur

REQUIREMENTS

Thermal transfer and fluid mechanics courses

IDENTIFICATION

Course code : ESI-SPI-CI-BE4-S7-UE2-EC6
ECTS : 0.5

DURATION

Lectures : 8
Tutorial classes : 8
Labs : 0
Total : 16

Project :
Personnal work :

ASSESSMENT

Continuous Assessment (40%) : Oral participation and short writing exercises during sessions. Final Assessment (60%) : * Oral (30%) : Simulation of a site meeting or presentation of a business plan (5-10 min). Written (30%) : Drafting a formal response to a client issue (complex email or memo).

TEACHING MATERIALS

Press articles (Financial Times, The Economist), business podcasts, and technical videos.

LANGUAGE

English

CONTACT

Mathieu DAVID
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Modifié le : 3 août 2026

UE : UE7-QEB

COURSE : Business English

SCOPE OF THE COURSE

OBJECTIVES

Transmit professional communication codes : Learn language registers (formal/informal) and cultural specifics of the English-speaking business world.
Provide meeting and negotiation tools : Teach standard sentence structures for chairing, arguing, interrupting, or concluding exchanges.
Introduce technical and commercial writing : Teach the standard structure of emails, memos, and activity reports in English.
Develop public speaking skills : Prepare students to present a project in a structured and convincing manner (Pitch).
Enhance "Business & Management" vocabulary : Introduce terms related to corporate finance, human resources, and project management.

COMPETENCE AND SKILLS

Linguistic & Operational Skills :
Write professional documents without register errors : Respond to a client, supplier, or partner with the appropriate tone (e.g., handling a dispute or requesting a quote).
Interact in international meetings : Be able to follow the agenda, express nuanced agreement/disagreement, and summarize decisions made orally.
Deliver an "Elevator Pitch" : Present your profile as a Building & Energy engineer or a technical innovation in under 3 minutes in a compelling way.
Transversal Skills (Soft Skills) :
Negotiate in an intercultural context : Adapt communication to English-speaking interlocutors (directness vs. politeness).
Handle unexpected situations orally : Reformulate an idea or ask clarifying questions to maintain communication despite lexical gaps.

PROGRAM

1. Corporate Identity & Career : Company presentation (structure, values, Construction/Energy sector). Job interview simulation and Elevator Pitch.
2. Effective Communication : Professional emailing codes, phone calls, and videoconferences. The art of summarizing and courtesy (Polite requests).
3. Meetings & Negotiations : Meeting vocabulary : opening a session, giving opinions, interrupting, concluding. Basic negotiation techniques.
4. Project Management : Technical presentation of a project (Building & Energy). Managing deadlines, unexpected events, and progress reports.

BIBLIOGRAPHY

REQUIREMENTS

English level B2

IDENTIFICATION

Course code : ESI-SPI-CI-BE4-S7-UE1-EC1
ECTS : 0.5

DURATION

Lectures : 8
Tutorial classes : 8
Labs : 0
Total : 16

Project :
Personnal work :

ASSESSMENT

Minimum 2 continuous assessments

TEACHING MATERIALS

Course support (ppt)

LANGUAGE

English

CONTACT

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HYPPOLITE
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Modifié le : 3 août 2026

UE : UE7-STRUC

COURSE : Labour and Business Law

SCOPE OF THE COURSE

OBJECTIVES

The aim of this course is to acquire a thorough understanding of labour law and business law, focusing on contract negotiation and management, as well as the legal aspects related to the organization and regulation of companies, including insolvency prevention and competition law.

COMPETENCE AND SKILLS

Ability to consider the company's challenges.

PROGRAM

Labour Law

- Contract negotiation.
- Different types of contracts : supply of goods and service provision.
- Specific contractual clauses.
- Contractual disputes.

Business Law

- General legal mechanisms.
- Legal framework for business activities.
- Legal organization of companies.
- Company failures : prevention, collective proceedings.
- Competition law.

BIBLIOGRAPHY

INRS documents

REQUIREMENTS

IDENTIFICATION

Course code : ESI-SPI-CI-BE4-S7-UE1-EC2
ECTS : 2

DURATION

Lectures : 8
Tutorial classes : 16
Labs : 0
Total : 24

Project :
Personnal work :

ASSESSMENT

2 continuous assessments

TEACHING MATERIALS

course material

LANGUAGE

English

CONTACT

Sébastien HILAIRE
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Modifié le : 3 août 2026

UE : UE7-STRUC

COURSE : Load analysis and bracing design

SCOPE OF THE COURSE

OBJECTIVES

Introduction to Eurocodes 0 and 1/ Determine applied loads on a simple structure (G, Q, W, Sn) Calculate various load combinations (ULS, SLS) – Concept of envelope curve Analyse and calculate load distribution in a building structure Analyse the bracing system of a metal-framed building : cross bracing, wind beam, strut, purlin, tie beam.

COMPETENCE AND SKILLS

STRUC Competency – Level 2

PROGRAM

Introduction to Eurocodes 0 and 1/ Applied loads on a simple structure (G, Q, W, Sn) – Calculation and modelling Load combinations (ULS, SLS) – Concept of envelope curve Load distribution, influence areas, reduction of imposed loads (EC1) Bracing of a metal structure (tie beam, cross bracing, wind beam)

BIBLIOGRAPHY

Eurocodes 0 and 1

REQUIREMENTS

3rd-year course : Construction Techniques (execution plans), isostatic structures, hyperstatic structures, SAe Struc 1

IDENTIFICATION

Course code : ESI-SPI-CI-BE4-
S7-UE1-EC3
ECTS : 0

DURATION

Lectures : 4
Tutorial classes : 0
Labs : 0
Total : 4

Project :
Personnal work :

ASSESSMENT

Critical learning outcomes will be assessed based on deliverables, using a criterion-based rubric presented to students in advance, as well as an oral presentation.

TEACHING MATERIALS

All documents used during the course. If necessary, additional documentary references may be provided.

LANGUAGE

English

CONTACT

Sébastien HILAIRE
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Modifié le : 3 août 2026

UE7-STRUC

SAE

SCOPE OF THE CHALLENGE

WORKING SITUATION

STRUC Competence - Level 2 Design and dimension the structure of building-type structures, particularly in extreme environments

COMPETENCES AND LEVEL ASSESSED

STRUC Competence - Level 2 Dimension a simple building structure as a whole

EXPECTED OUTPUTS

Eurocodes 0, 1, 2, and 5

RESOURCES

Eurocodes 0, 1, 2, and 6

IDENTIFICATION

Course code : ESI-SPI-CI-BE4-S7-UE1-EC4
ECTS : 2

DURATION

Lectures : 12
Tutorial classes : 16
Labs : 0
Total : 28

Project :
Personnal work :

ASSESSMENT

1 written exam and 1 mini-project

TEACHING MATERIALS

course material

LANGUAGE

English

CONTACT

Sébastien HILAIRE
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Modifié le : 3 août 2026

UE : UE7-STRUC

COURSE : Reinforced concrete structures

SCOPE OF THE COURSE

OBJECTIVES

To know and master all theoretical and practical concepts required to design reinforced concrete structures according to Eurocode 2 (tension, compression with buckling, simple and combined bending)

COMPETENCE AND SKILLS

STRUC Competence - Level 2 Design and verification of all reinforced concrete elements in a typical building structure

PROGRAM

• Generalities • Materials used in reinforced concrete • Durability and concrete cover for reinforcement • Actions and loadings • Bond between steel and concrete • Tension members • Columns • Rectangular beams under simple bending at ULS • T-beams under simple bending at ULS • Stress verification at SLS • Bar curtailment diagram • Shear effects in simple bending - Shear force effects • Reinforced concrete slabs • Strip and rectangular footings • Combined bending

BIBLIOGRAPHY

Pratique de l'eurocode 2 - Jean Roux Maîtrise de l'eurocode 2 - Jean Roux Calcul des structures en béton - Jean-Marie Paillé

REQUIREMENTS

Mathematics course. Course on structural mechanics (isostatic and hyperstatic structures). Load path analysis and bracing course

IDENTIFICATION

Course code : ESI-SPI-CI-BE4-S7-UE1-EC5
ECTS : 2

DURATION

Lectures : 12
Tutorial classes : 12
Labs : 2
Total : 26

Project :
Personnal work :

ASSESSMENT

1 written exam and 1 mini-project

TEACHING MATERIALS

Course material

LANGUAGE

English

CONTACT

Sébastien HILAIRE
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Modifié le : 3 août 2026

UE : UE7-STRUC

COURSE : Steel structures

SCOPE OF THE COURSE

OBJECTIVES

To know and master all theoretical and practical concepts required to design metal structures according to Eurocode 3.

COMPETENCE AND SKILLS

STRUC Competence - Level 2 Design and verification of all metal elements in a typical structure such as a hangar, gymnasium, etc.

PROGRAM

• Materials • EC3 design basics • Resistance of cross-sections without instability • Buckling • Lateral-torsional buckling • Considering instability in bending • Flowcharts • Connections • Web buckling • Design of elements in a steel building

BIBLIOGRAPHY

Calcul et dimensionnement selon les Eurocodes 3 et 4 by Jacques Brozzetti and Pierre Bourrier
Calcul des structures métalliques selon l'Eurocode 3 by Jean Morel

REQUIREMENTS

Mathematics course. Course on mechanics of isostatic and hyperstatic structures. Load path and bracing course

IDENTIFICATION

Course code : ESI-SPI-CI-BE4-
S7-UE1-EC6
ECTS : 1

DURATION

Lectures : 0
Tutorial classes : 10
Labs : 0
Total : 10

Project :
Personnal work :

ASSESSMENT

At least two continuous assessments.

TEACHING MATERIALS

Slides and guided work sheets.

LANGUAGE

English

CONTACT

Jean Jacques KADJO
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Modifié le : 3 août 2026

UE : UE7-STRUC

COURSE : L2 or intensive English

SCOPE OF THE COURSE

OBJECTIVES

This course aims to develop students' linguistic, cultural, and communicative skills in a second modern language (Chinese or Spanish). It focuses on acquiring language fundamentals, oral and written fluency, as well as exploring associated cultures, to prepare students for interactions in personal, professional, or academic contexts.

COMPETENCE AND SKILLS

- Communicate with various stakeholders (clients, management, users, IT managers, authorities such as CNIL or ANSSI) in writing and orally
- Ensure appropriate communication with stakeholders, including clients, administrations, citizens, and civil society.

PROGRAM

1. Language initiation

- Basic grammatical structures : present tense, adjectives, pronouns.

2. Oral communication

- Techniques to improve pronunciation and oral fluency.

3. Written comprehension and expression

- Writing simple letters or emails (self-introduction, information requests).

4. Language and intercultural deepening

- Study of songs, poems, or literary excerpts adapted to the level.

5. Practical project and continuous assessment

- Regular oral and written evaluations to monitor progress.

BIBLIOGRAPHY

REQUIREMENTS

IDENTIFICATION

Course code : ESI-SPI-CI-BE4-S8-UE3-EC1
ECTS : 1.5

DURATION

Lectures : 4
Tutorial classes : 8
Labs : 0
Total : 12

Project :
Personnal work :

ASSESSMENT

Group project : Conducting a "Mini-Audit" on a case study

TEACHING MATERIALS

Presentations, regulations, case studies

LANGUAGE

English

CONTACT

Modifié le : 3 août 2026

UE : UE8-EFFI

COURSE : Energy Performance Diagnosis and Improvement

SCOPE OF THE COURSE

OBJECTIVES

Master the energy audit methodology : Know how to collect data, analyze bills, and instrument a building. Perform regulatory and technical diagnostics : Understand the DPE (DOM version) and comprehensive audits. Model and simulate existing conditions : Use Dynamic Thermal Simulation (STD) to calibrate a model based on actual consumption. Recommend improvement scenarios : Propose technically coherent and economically viable work packages (ROI). Integrate tropical thermal comfort : Prioritize passive solutions (roof insulation, air circulators) before active solutions.

COMPETENCE AND SKILLS

Conduct an on-site technical survey : Use measurement tools (thermal camera, wattmeters, temperature/humidity loggers). Identify energy-saving potential : Prioritize consumption areas (Air conditioning, DHW, Lighting). Quantify and justify a renovation program : Calculate the payback period and carbon impact of proposed solutions. Advise the project owner : Simplify technical results to support decision-making (e.g., transition to solar thermal, changing air handling units).

PROGRAM

1. Regulatory Framework & Challenges : Réunion Island context, Tertiary Decree, RTAA DOM, PERENE, local energy mix decarbonization targets.
2. Audit Methodology : Site preparation, bill analysis, building typologies (residential vs. tertiary).
3. Instrumentation & Measurements : Practical use of tools : thermal camera (identifying thermal bridges), dataloggers (temperature/humidity).
4. Simulation & Calibration : Principles of STD applied to existing conditions. How to align the numerical model with reality ?
5. Improvement Scenarios : Insulation, solar protection, air conditioning optimization, LED lighting, smart control.
6. Economic Analysis & Decision Support : Total cost, financial aid (CEE, regional subsidies), drafting the summary report.

BIBLIOGRAPHY

REQUIREMENTS

Heat transfer, Thermodynamics, Energy simulation software tools 1 and 2, Thermal regulations and labels

IDENTIFICATION

Course code : ESI-SPI-CI-BE4-S8-UE3-EC2
ECTS : 1

DURATION

Lectures : 0
Tutorial classes : 4
Labs : 10
Total : 14

Project :
Personnal work :

ASSESSMENT

Deliverables and presentations

TEACHING MATERIALS

Mission support, data, guides, reports...

LANGUAGE

English

CONTACT

Khalid ADDI

Modifié le : 3 août 2026

UE : UE8-EFFI

COURSE : Innovation competition

SCOPE OF THE COURSE

OBJECTIVES

This course aims to develop students' ability to successfully carry out, in groups (7 to 12 students), an innovation project related to problem-solving, continuous improvement, or the design of new disruptive solutions, while considering sustainability challenges.

COMPETENCE AND SKILLS

To mobilize and combine tools related to innovation methodology acquired in the resources, to learn how to learn (supplementing tools...), to work in a project group (shared reflexivity, autonomy, time and stress management...), to communicate and convince

PROGRAM

Downstream innovation : Prototyping, feasibility, launch

BIBLIOGRAPHY

According to the year's project

REQUIREMENTS

Project management, survey management, marketing, creativity methods. These prerequisites are acquired beforehand in the curriculum resources or during the year through autonomous or guided learning.

IDENTIFICATION

Course code : ESI-SPI-CI-BE4-S8-UE3-EC3
ECTS : 1.5

DURATION

Lectures : 4
Tutorial classes : 4
Labs : 0
Total : 8

Project :
Personnal work :

ASSESSMENT

Continuous assessment : Completion of a full functional analysis (Octopus + FAST) on a construction element or a specific energy system.

TEACHING MATERIALS

Lectures, tutorials and case studies

LANGUAGE

English

CONTACT

Modifié le : 3 août 2026

UE : UE8-EFFI

COURSE : Functional analysis applied to the construction process

SCOPE OF THE COURSE

OBJECTIVES

Defining needs : Learning to translate a project owner's expectations into functions and technical constraints. Mastering AF tools : Using standardized diagrams to structure thinking (Horned Beast, Octopus, FAST). Applying AF to the building life cycle : Understanding the interaction between the structure and its environment (climatic, regulatory, human). Optimizing design : Using value analysis to eliminate unnecessary or overly costly functions.

COMPETENCE AND SKILLS

Developing a Functional Specification Document (FSD) : Listing the service functions (main and constraint) of a building subsystem (e.g., a façade, a ventilation system). Prioritizing needs : Balancing energy performance, construction cost and user comfort. Justifying technical choices : Being able to explain why a solution was selected based on the services provided.

PROGRAM

Session 1 : Fundamentals and External Analysis (4h) Needs and the object : Introduction to Functional Analysis of Needs (FAN). The Horned Beast diagram : To whom does the structure provide a service? On what does it act? The Octopus diagram : Identifying relationships between the structure and its external environment (tropical climate, energy, maintenance, users, standards). Writing the FSD : Characterizing functions (criteria, levels, flexibility).

Session 2 : Internal Analysis and Case Study (4h) The FAST diagram (Functional Analysis System Technique) : Moving from "Why" to "How" (Translating a function into a technical solution). Value Analysis : Relationship between the cost of a function and its importance to the user. Tutorial application : Functional analysis of a system specific to Réunion Island (e.g., an adjustable sunshade or an energy storage system for an isolated site).

BIBLIOGRAPHY

REQUIREMENTS

None

IDENTIFICATION

Course code : ESI-SPI-CI-BE4-S8-UE3-EC4
ECTS : 0

DURATION

Lectures : 4
Tutorial classes : 0
Labs : 0
Total : 4

Project :
Personnal work :

ASSESSMENT

TEACHING MATERIALS

LANGUAGE

English

CONTACT

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Modifié le : 3 août 2026

UE8-EFFI

SAE

SCOPE OF THE CHALLENGE

WORKING SITUATION

COMPETENCES AND LEVEL ASSESSED

EXPECTED OUTPUTS

RESOURCES

IDENTIFICATION

Course code : ESI-SPI-CI-BE4-
S8-UE3-EC5
ECTS : 2

DURATION

Lectures : 2
Tutorial classes : 0
Labs : 0
Total : 2

Project :
Personnal work :

ASSESSMENT

TEACHING MATERIALS

LANGUAGE

English

CONTACT

Modifié le : 3 août 2026

UE : UE8-EFFI

COURSE : Project

SCOPE OF THE COURSE

OBJECTIVES

COMPETENCE AND SKILLS

PROGRAM

· Fire resistance

BIBLIOGRAPHY

REQUIREMENTS

IDENTIFICATION

Course code : ESI-SPI-CI-BE4-S8-UE3-EC6
ECTS : 1.5

DURATION

Lectures : 8
Tutorial classes : 8
Labs : 0
Total : 16

Project :
Personnal work :

ASSESSMENT

Oral simulation : Role-playing exercise (filmed or observed, e.g., conducting a difficult feedback interview). Personal reflection : Writing a "Leader's Logbook" (2-3 pages) where the student analyzes their strengths and areas for improvement following workshops.

TEACHING MATERIALS

Lectures, tutorials, and case studies

LANGUAGE

English

CONTACT

Modifié le : 3 août 2026

UE : UE8-EFFI

COURSE : Management and Leadership

SCOPE OF THE COURSE

OBJECTIVES

Distinguishing Management and Leadership : Understanding the difference between hierarchical authority (status) and natural influence (leadership). Developing emotional intelligence : Learning to know oneself in order to better interact with others (self-assessment, empathy). Mastering management tools : Knowing how to delegate, set objectives (SMART), and conduct a corrective or motivational interview. Managing team dynamics : Understanding the stages of group formation (Forming, Storming, Norming, Performing). Introduction to conflict management : Learning to defuse tensions within a project team or on a construction site.

COMPETENCE AND SKILLS

Adapting one's management style : Knowing how to shift from a directive to a participative or delegative approach based on the maturity of the individual. Leading a team toward a common goal : Uniting around a technical vision or a project milestone. Communicating with assertiveness : Knowing how to say "no" or provide constructive feedback without damaging the relationship. Making decisions in complex situations : Arbitrating with ethics and responsibility.

PROGRAM

1. Leadership Postures & Styles : Manager profile test. Situational leadership model (Hersey & Blanchard).
2. Communication & Emotional Intelligence : Active listening, non-violent communication (NVC) applied to construction.
3. Driving Human Performance : Setting SMART objectives, motivation levers (Maslow / Herzberg), effective delegation.
4. Group Management & Conflicts : Role-playing exercises : managing delays on a construction site or disagreements in an engineering office.

BIBLIOGRAPHY

REQUIREMENTS

None

IDENTIFICATION

Course code : ESI-SPI-CI-BE4-S8-UE3-EC7
ECTS : 0

DURATION

Lectures : 0
Tutorial classes : 0
Labs : 0
Total : 0

Project :
Personnal work :

ASSESSMENT

Regular individual meetings with a designated tutor teacher

TEACHING MATERIALS

Competency reference framework for the specialization Deliverables from SAEs IT tool supporting the portfolio

LANGUAGE

English

CONTACT

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Modifié le : 3 août 2026

UE : UE8-EFFI

COURSE : Portfolio

SCOPE OF THE COURSE

OBJECTIVES

The objective of this course is to support the engineering student in building their competency portfolio throughout their time at the school, in order to develop their profile in line with their professional project.

COMPETENCE AND SKILLS

Develop the ability to self-assess, manage one's skills (particularly with a view to lifelong learning), and make professional choices

PROGRAM

- Understanding the competency-based approach and the portfolio tool
- Importing evidence elements (traces) justifying the validation of first-year engineering cycle competency levels
- Reflection on the professional project : in which competency(ies) the engineering student wishes to build their career
- Potential valorization of extracurricular activities
- Construction of the professional project (S5, 30 min)

BIBLIOGRAPHY

REQUIREMENTS

IDENTIFICATION

Course code : ESI-SPI-CI-BE4-S8-UE4-EC1
ECTS : 3

DURATION

Lectures : 0
Tutorial classes : 20
Labs : 10
Total : 30

Project :
Personnal work :

ASSESSMENT

2 Continuous Assessments + an average of homework assignments (grammar).
Several TOEIC Mock Tests.

TEACHING MATERIALS

Adaptive and varied supports tailored to competencies.

LANGUAGE

English

CONTACT

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Modifié le : 3 août 2026

UE : UE8-PROEN

COURSE : English

SCOPE OF THE COURSE

OBJECTIVES

Deepen strategies for written comprehension of technical documents / TOEIC.
Structure and articulate oral presentations : Technical talks and research on scientific topics. Structure written discourse : Technical report.

COMPETENCE AND SKILLS

Written comprehension. Written expression. Oral expression.

PROGRAM

Pragmatic competence : Interactive oral communication through appropriate tasks. Continuous oral presentation (internship in an English-speaking environment). Writing of internship reports, academic English.

Sociolinguistic competence : Formal language register : Technical and scientific English. General language register : American accent / TOEIC.

Linguistic competence : Vocabulary : Business English : announcements, weather, corporate life, IT. Phonology : Auditory discrimination : Mastering homophones, similar sounds. Grammar : Verb group : hypotheses, agreement, causatives, gerunds or infinitives. Noun group : articles, agreements, adverbs, linking words, common pitfalls.

BIBLIOGRAPHY

Cambridge/Oxford Dictionary online.

English current affairs/press : BBC News/CNN.

TOEIC past papers.

The British Council : English for business and work.

REQUIREMENTS

Level B2

IDENTIFICATION

Course code : ESI-SPI-CI-BE4-S8-UE4-EC2
ECTS : 1.5

DURATION

Lectures : 8
Tutorial classes : 12
Labs : 0
Total : 20

Project :
Personnal work :

ASSESSMENT

Minimum 2 continuous assessments

TEACHING MATERIALS

Course materials : .pdf, .ppt, and online during class

LANGUAGE

English

CONTACT

Jean Jacques KADJO Instructors : Teddy LIBELLE & Cynthia CLAIN
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Modifié le : 3 août 2026

UE : UE8-PROEN

COURSE : Entrepreneurship

SCOPE OF THE COURSE

OBJECTIVES

The goal of this course is to train learners in drafting a comprehensive business plan, covering each key step from defining the company's mission to market analysis, including the business model, competition, team, finances, and the executive summary.

COMPETENCE AND SKILLS

Skills : ability to structure, present a business creation project, and persuade. Knowledge of various public and private funding sources.

— Innovation strategy

Skills : ability to devise a strategy. Recognize different types of innovation.

PROGRAM

In-depth methodology for drafting a business plan

- Company mission
- Problem
- Solution
- Why now
- Market
- Competition
- Product
- Business model
- Team
- Finances and executive summary.

BIBLIOGRAPHY

Start-up : L'anti-bible à l'usage des fous et des futurs entrepreneurs by Bruno Martinaud, 2012, series : Village Mondial, Pearson
Lean start-up by Eric Ries, 2012, series : Village Mondial, Pearson

Dragon Den : www.bbc.co.uk/programmes/b006vq92

Entrepreneurs pitch their business ideas to millionaires willing to invest their own cash.

REQUIREMENTS

Basic knowledge of accounting and financial analysis.

IDENTIFICATION

Course code : ESI-SPI-CI-BE4-S8-UE4-EC3
ECTS : 1.5

DURATION

Lectures : 0
Tutorial classes : 12
Labs : 0
Total : 12

Project :
Personnal work :

ASSESSMENT

- In-class assignments - Homework assignments

TEACHING MATERIALS

- Course and TD handouts - Past exam papers - In-house calculation tools

LANGUAGE

English

CONTACT

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Modifié le : 3 août 2026

UE : UE8-PROEN

COURSE : Other RES than solar

SCOPE OF THE COURSE

OBJECTIVES

Master all means of production and conversion of renewable energy

COMPETENCE AND SKILLS

Master all means of production and conversion of renewable energy.

PROGRAM

- Energy mix and the share of renewables
- Electricity production from hydropower
 - Operating principles and technologies
 - Characteristics and sizing
 - Regulatory aspects
- Electricity production from wind energy
 - Operating principles and technologies
 - Characteristics and sizing
 - Regulatory aspects
- Ocean thermal energy conversion
 - SWAC (Sea Water Air Conditioning) : Principle and example from Réunion
 - Electricity production from OTEC : principle and Réunion example
- Wave energy systems : Principle, conversion, storage and example from Réunion
- Geothermal energy, Canadian and Provençal wells.

BIBLIOGRAPHY

- Gérard Sarlos, Pierre-André Haldi, Pierre Verstraete. Systèmes énergétiques (Traité de Génie Civil volume 21). EAN13 : 9782880744649
- Francis Meunier. Les énergies renouvelables. EAN13 : 9782846703031
- Le livre blanc des énergies renouvelables. syndicat des énergies renouvelables

REQUIREMENTS

- Thermodynamics
- Fluid mechanics
- Heat transfer

IDENTIFICATION

Course code : ESI-SPI-CI-BE4-S8-UE4-EC4
ECTS : 1.5

DURATION

Lectures : 4
Tutorial classes : 8
Labs : 0
Total : 12

Project :
Personnal work :

ASSESSMENT

TEACHING MATERIALS

LANGUAGE

English

CONTACT

Jean.CASTAING LAVIGNOTTES
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Modifié le : 3 août 2026

UE : UE8-PROEN

COURSE : Solar Thermal 2 : Modeling and Performance Indicators

SCOPE OF THE COURSE

OBJECTIVES

COMPETENCE AND SKILLS

PROGRAM

BIBLIOGRAPHY

REQUIREMENTS

IDENTIFICATION

Course code : ESI-SPI-CI-BE4-S8-UE2-EC1
ECTS : 1.5

DURATION

Lectures : 4
Tutorial classes : 8
Labs : 0
Total : 12

Project :
Personnal work :

ASSESSMENT

1 case study grade. Assessment is based on case studies focusing on the analysis of a building's compliance with various labels (PERENE/RT2ADOM/LEED or others). The required deliverable is an analysis report, supplemented by an oral presentation in English or French.

TEACHING MATERIALS

Handout

LANGUAGE

English

CONTACT

Simon CHAUVAT
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Modifié le : 3 août 2026

UE : UE8-QEB

COURSE : Thermal regulations and labels

SCOPE OF THE COURSE

OBJECTIVES

Understanding of regulations and passive construction benchmarks in Réunion, in tropical climates, and more broadly worldwide
Practical experience with PERENE / RTAA DOM

COMPETENCE AND SKILLS

Ability to design and/or analyze a building project in relation to regulatory requirements or label performance criteria.

PROGRAM

Thermal basics recap (thermal resistance, solar factor of opaque walls, solar factor of glazed walls)
Regulations and labels applicable in the French overseas departments (DOM) :

- RT2ADOM ;
- The PERENE tool ;
- CERQUAL DOM certification ;
- ECODOM+ (French Guiana).

Various thermal labels in tropical environments :

- In France : CERQUAL, Certivea, BBC Effinergie, the HQE approach ;
- Internationally : LEED, BREEAM, Green Star, NABERS, etc. ;
- Presentation of Green Building Councils ;
- Advantages and disadvantages of each label.

BIBLIOGRAPHY

RTAA DOM regulation
PERENE benchmark
ECODOM+ benchmark
MAYENERGIE+ benchmark
CERQUAL DOM benchmark
LEED, BREEAM regulations

REQUIREMENTS

No prerequisites required

IDENTIFICATION

Course code : ESI-SPI-CI-BE4-S8-UE2-EC2
ECTS : 1

DURATION

Lectures : 0
Tutorial classes : 12
Labs : 0
Total : 12

Project :
Personnal work :

ASSESSMENT

Minimum 1 continuous assessment

TEACHING MATERIALS

N/A

LANGUAGE

English

CONTACT

Barbureau Thomas
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Modifié le : 3 août 2026

UE : UE8-QEB

COURSE : Sports

SCOPE OF THE COURSE

OBJECTIVES

- Develop and improve one's HEALTH
 - Engage in effort (intensity/duration)
 - Analyze and understand the causes and effects of an action
- Gain self-awareness
 - Discover one's physical and mental resources and abilities
 - Improve self-confidence by working on self-esteem

COMPETENCE AND SKILLS

- Develop and mobilize one's resources (emotional/physical) to enhance motor skills, make them effective, and promote success
- Develop methodological knowledge for organization and risk management related to practices
- Enhance leadership skills (managing a group, justifying decisions, kindness, fostering trust and collaboration)
- Improve HEALTH and understand key principles to manage one's physical, mental, and social life throughout life.

PROGRAM

- Racket sports : learning and improvement in badminton
- Artistic activities : discovery and hands-on experience in Acrosport
- Team sports : training and coaching in Volleyball, Beach Volleyball, or Basketball
- Water sports : initiation and improvement in Kayaking
- Physical conditioning activities : introduction to general physical preparation and weight training
- Outdoor sports : initiation and improvement in Orienteering (CO) or climbing

BIBLIOGRAPHY

N/A

REQUIREMENTS

No prerequisites

IDENTIFICATION

Course code : ESI-SPI-CI-BE4-
S8-UE2-EC3

ECTS :

DURATION

Lectures :	4
Tutorial classes :	0
Labs :	0
Total :	4

Project :
Personnal work :

ASSESSMENT

TEACHING MATERIALS

LANGUAGE

English

CONTACT

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Modifié le : 3 août 2026

UE8-QEB

SAE

SCOPE OF THE CHALLENGE

WORKING SITUATION

COMPETENCES AND LEVEL ASSESSED

EXPECTED OUTPUTS

RESOURCES

IDENTIFICATION

Course code : ESI-SPI-CI-BE4-S8-UE2-EC4
ECTS : 1.5

DURATION

Lectures : 8
Tutorial classes : 0
Labs : 12
Total : 20

Project :
Personnal work :

ASSESSMENT

Continuous Assessment and Project (Development of a maintenance and operations strategy for a building)

TEACHING MATERIALS

Course materials : .pdf, .ppt, and online during class

LANGUAGE

English

CONTACT

Modifié le : 3 août 2026

UE : UE8-QEB

COURSE : Building Maintenance and Operations

SCOPE OF THE COURSE

OBJECTIVES

Understand the building lifecycle : Grasp the transition from delivery (GPA) to routine operations. Master maintenance types : Distinguish and plan preventive, corrective, and predictive maintenance. Optimize energy performance : Learn to control systems (BMS/BAS) to maintain consumption targets (Tertiary Decree). Understand regulatory frameworks : Master obligations related to ERP (Establishments Receiving the Public) and fire safety. Use digital tools : Get introduced to CMMS (Computerized Maintenance Management System) and BIM FM (Facility Management).

COMPETENCE AND SKILLS

Develop a maintenance plan : Inventory technical equipment (HVAC, electrical, envelope) and define intervention frequencies. Manage a performance contract : Draft or analyze a maintenance service specification (CCTP). Conduct a technical audit : Assess a building's condition and recommend improvement or compliance works. Handle digital operations : Exploit sensor data to optimize thermal comfort and energy efficiency.

PROGRAM

1. Introduction & Challenges : Lifecycle, total cost of ownership (LCC), environmental and financial stakes of operations.
2. Maintenance Strategies : Preventive vs. corrective maintenance. Performance indicators (MTBF, MTTR).
3. Regulations & Safety : Safety register, periodic regulatory inspections, accessibility.
4. Energy Operations : Consumption monitoring, BMS/BAS control, Energy Performance Contracts (EPC).
5. Digital Tools : Introduction to CMMS and transition from BIM "As-Built" to BIM "Operations".
6. Case Study : Analysis of a real building in Réunion Island (e.g., a high school or office building) and development of a maintenance plan.

BIBLIOGRAPHY

REQUIREMENTS

Building techniques

IDENTIFICATION

Course code : ESI-SPI-CI-BE4-S8-UE2-EC5
ECTS : 2.5

DURATION

Lectures : 12
Tutorial classes : 12
Labs : 16
Total : 40

Project :
Personnal work :

ASSESSMENT

2 continuous assessment grades and 4 practical works

TEACHING MATERIALS

Digital resources : course booklets, presentations, standards, regulations, and software

LANGUAGE

English

CONTACT

Mathieu DAVID
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Modifié le : 3 août 2026

UE : UE8-QEB

COURSE : Lighting and Acoustics

SCOPE OF THE COURSE

OBJECTIVES

Design of artificial lighting and evaluation of natural lighting quality
Assessment of acoustic nuisances and design of solutions for buildings

COMPETENCE AND SKILLS

Advanced knowledge for manual calculation of illuminance on the work plane for artificial lighting and numerical simulation of visual comfort in natural lighting.
Basic knowledge for using an integrating sound level meter and implementing regulatory calculations in building acoustics within a humid tropical context (use of natural cross-ventilation in rooms).

PROGRAM

Theoretical part (lectures and tutorials in English) : - Basics of lighting and day-lighting : Physical quantities, units, measures, color temperature and rendering. - Artificial lighting : Technologies, luminous efficacy and photometric curves. - Daylighting : Outside illuminance, sky luminance and models, daylight factor and Useful Daylight Illuminance (UDI). - Daylighting software : Daysim. - Generalities and theory of acoustic waves. - Free-field propagation. - Acoustic correction. - Acoustic insulation. - Acoustic regulations in the French overseas departments.

Practical part (4 lab sessions) : - Lab session 1 : Recording of photometric curves and determination of luminaire luminous efficacy, application to the design of artificial lighting for a room. - Lab session 2 : Mapping of Daylight Factor, UDI, and Daylight Autonomy for a real case. - Lab session 3 : Acoustic attenuation of single and double walls, laboratory testing. - Lab session 4 : Acoustic insulation against airborne and impact noise in real situations, regulatory calculations and measurements.

BIBLIOGRAPHY

Gary Gordon, *Interior Lighting for Designers*, 4th ed. (New Jersey : John Wiley & Sons, Inc., 2003), 124.
Susan M. Winchip, *Designing a Quality Lighting Environment* (New York : Fairchild Publications, Inc., 2005), 158.
Reinhart C F, *Daylight Availability and Manual Lighting Control in Office Buildings*, Fraunhofer IRB Verlag, Stuttgart, Germany, 2001.
Jacques Jouhaneau, *Acoustique des salles et sonorisation* [Room Acoustics and Sound Reinforcement], Technique et Doc (ISBN : 978-2743004637).

REQUIREMENTS

Building processes, energy transfer by radiation, signal processing

IDENTIFICATION

Course code : ESI-SPI-CI-BE4-S8-UE2-EC6
ECTS : 1

DURATION

Lectures : 4
Tutorial classes : 0
Labs : 0
Total : 4

Project :
Personnal work :

ASSESSMENT

1 project grade

TEACHING MATERIALS

LANGUAGE

English

CONTACT

Mathieu DAVID
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Modifié le : 3 août 2026

UE : UE8-QEB

COURSE : Workshop architecture

SCOPE OF THE COURSE

OBJECTIVES

Group work with a mix of engineering students and architecture students on a project over one week.

The groups will be in a situation of submitting a design competition entry (Moe), particularly developing aspects related to environmental quality.

This project is an opportunity to assess the acquisition of the various knowledge and skills acquired throughout the domain related to building design in a tropical environment.

COMPETENCE AND SKILLS

To be able to work in a team and collaborate with architecture students on a design project (building or district).

PROGRAM

Course plan : Presentation of the project programme developed in partnership ESIROI/ENSAM

Division into subgroups (depending on numbers) and consideration of different aspects :

- Building orientation and urban forms in relation to climate and urban constraints (taking into account the context : PLU, topography, landscape) ;
- Optimisation of forms with consideration for urban aerodynamics ;
- Optimisation of the building envelope (solar protection, cross-ventilation, natural lighting, resource management, maintenance) ;
- Economic and social impact of the built environment ;
- Enhancement of local, natural and human resources ;
- Consideration of architectural and urban data within the framework of an Engineer/Architect teamwork.
- Final submission on the

BIBLIOGRAPHY

REQUIREMENTS

Heat transfer, Fluid mechanics, Thermodynamics, Software tools in energy simulation 1.

IDENTIFICATION

Course code : ESI-SPI-CI-BE4-S8-UE1-EC1
ECTS : 3

DURATION

Lectures : 4
Tutorial classes : 12
Labs : 0
Total : 16

Project :
Personnal work :

ASSESSMENT

Minimum 2 continuous assessments.

TEACHING MATERIALS

LANGUAGE

English

CONTACT

Jean Jacques KADJO Lecturer : Sami OUA-DRANI
amangoua.kadjo@univ-reunion.fr

Modifié le : 3 août 2026

UE : UE8-STRUC

COURSE : Human Resources Management

SCOPE OF THE COURSE

OBJECTIVES

Establish and monitor salary policy.

COMPETENCE AND SKILLS

Be able to plan recruitment and training actions.

PROGRAM

- From personnel administration to HRM.
- HRM and production models.
- Major schools of thought.
- Contingency and HR.
- GPEC (Workforce Planning and Development).
- Recruitment.
- Performance appraisal.
- Training.
- Compensation.
- International HR management.

BIBLIOGRAPHY

REQUIREMENTS

None

IDENTIFICATION

Course code : ESI-SPI-CI-BE4-S8-UE1-EC2
ECTS : 3.5

DURATION

Lectures : 12
Tutorial classes : 12
Labs : 0
Total : 24

Project :
Personnal work :

ASSESSMENT

1 written exam and 1 mini-project

TEACHING MATERIALS

course material

LANGUAGE

English

CONTACT

Sébastien HILAIRE
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Modifié le : 3 août 2026

UE : UE8-STRUC

COURSE : Timber Structures

SCOPE OF THE COURSE

OBJECTIVES

To know and master all theoretical and practical concepts required to design timber structures according to Eurocode 5.

COMPETENCE AND SKILLS

STRUC Competence - Level 2 Design and verification of all timber elements in a typical building structure

PROGRAM

• Eurocode 5 - generalities • Material properties • Ultimate limit states • Serviceability limit states • Connections • Eurocode 5 : other sections • Fire resistance

BIBLIOGRAPHY

REQUIREMENTS

Mathematics course. Structural mechanics course (isostatic and hyperstatic structures). Load path and bracing course

IDENTIFICATION

Course code : ESI-SPI-CI-BE4-S8-UE1-EC3
ECTS : 1

DURATION

Lectures :
Tutorial classes : 10
Labs : 0
Total : 10

Project :
Personnal work :

ASSESSMENT

At least two continuous assessments.

TEACHING MATERIALS

Slides and guided work sheets.

LANGUAGE

English

CONTACT

Jean Jacques KADJO
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Modifié le : 3 août 2026

UE : UE8-STRUC

COURSE : L2 or intensive English

SCOPE OF THE COURSE

OBJECTIVES

This course aims to develop students' linguistic, cultural, and communicative skills in a second modern language (Chinese or Spanish). It focuses on acquiring language basics, oral and written fluency, as well as discovering associated cultures, to prepare students for interactions in personal, professional, or academic contexts.

COMPETENCE AND SKILLS

- Communicate with various stakeholders (clients, management, users, IT managers, organizations -CNIL, ANSSI-) in writing and orally
- Ensure adequate communication with stakeholders, including clients, administrations, citizens, and civil society.

PROGRAM

1. Language initiation

- Basic grammatical structures : present tense, adjectives, pronouns.

2. Oral communication

- Techniques to improve pronunciation and oral fluency.

3. Written comprehension and expression

- Writing simple letters or emails (self-introduction, information requests).

4. Linguistic and intercultural deepening

- Study of songs, poems, or literary excerpts adapted to the level.

5. Practical project and continuous assessment

- Regular oral and written evaluations to monitor progress.

BIBLIOGRAPHY

REQUIREMENTS

IDENTIFICATION

Course code : E5BE9ZP1
ECTS : 2

DURATION

Lectures : 2
Tutorial classes : 10
Labs : 8
Total : 20

Project :
Personnal work :

ASSESSMENT

Lab report grade

TEACHING MATERIALS

Handouts and PowerPoint presentations

LANGUAGE

English

CONTACT

Didier CALOGINE Instructor : Manon Bonnafous
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Modifié le : 3 août 2026

UE : Aménagement

COURSE : BIM Management

SCOPE OF THE COURSE

OBJECTIVES

The aim is to acquire work methods based on collaboration around a digital model.

COMPETENCE AND SKILLS

To know how to manage a BIM project

PROGRAM

Generalities - Terminology, definitions, history of the BIM concept - Current status, prospects and advantages of BIM - Digital Mock-up, BIM and Open BIM, 2D Drawing, 3D Modelling and Digital Mock-up - Collaborative work and interoperability, IFC exchange format, collaborative platforms and BIM

BIM techniques and tools - BIM stakeholders and their tools - BIM in CAD, Thermal and Structural software editors, Asset Management BIM professions - Project owners, project managers and facility managers, Contractors - The BIM Manager - to define BIM processes and recommend the tools required for project implementation; - to develop a BIM charter; - to explain, or even train, project stakeholders in the effective use of BIM; - to coordinate the various teams through meeting facilitation; - to ensure compliance with BIM rules, draft conflict reports; - to monitor performance indicators; - to carry out technical watch and anticipate new regulations; - to implement technical support solutions for software and hardware; - to update the project's construction database.

BIM and legal aspects - Legal aspects of BIM, BIM specifications Applications and feedback - Case study of an industrial company - Case study of an architectural firm - Case study of a local authority

BIBLIOGRAPHY

REQUIREMENTS

IDENTIFICATION

Course code : E5BE9ZP2
ECTS : 3

DURATION

Lectures : 8
Tutorial classes : 24
Labs : 0
Total : 32

Project :
Personnal work :

ASSESSMENT

Project grade

TEACHING MATERIALS

PowerPoint presentations

LANGUAGE

English

CONTACT

Didier CALOGINE Instructor : Emmanuelle
Bernat Payet
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Modifié le : 3 août 2026

UE : Aménagement

COURSE : Urban Planning MT

SCOPE OF THE COURSE

OBJECTIVES

The aim is to study the specific features of sustainable urban development in tropical environments.

COMPETENCE AND SKILLS

Understand the challenges of sustainable tropical urban planning and identify priorities in development.

PROGRAM

Climate-responsive urban planning (in connection with the course "Aerodynamics of Buildings") • Various urban planning documents (PLUI, etc.) • Bioclimatic approach in sustainable urban planning (urban forms, the role of vegetation) • Development, architecture, and natural ventilation • Smart cities in tropical environments. What challenges for tomorrow's sustainable tropical city? • Case studies (Beauséjour and Coeur de Ville Possession) : o Neighborhood urbanization for a mixed program of individual and collective housing (site plan, intermediate spaces, hydraulics, vegetation, mobility, operation, quality of life, etc.) o Resources and autonomy of the mixed program of individual and collective housing o Quality of life and social projects for the mixed program of individual and collective housing Site visits to development projects (Beauséjour, Coeur de Ville Possession) Environmental law • Sources of environmental law o European sustainable development policy o National environmental law o Key stakeholders • Environmental impact assessment o Scope and content of the environmental impact assessment file o Procedure and publicity of the environmental impact assessment o Legal effects of the environmental impact assessment • Public inquiries o Bouchardeau Act o Scope and organization of the inquiry o Consolidation of inquiries o Scope of the inquiry • Public debate and consultation • Environmental assessment o European and national context o Different types of environmental assessments • Classified installations for environmental protection (ICPE) o Scope and competent institutions o Regulatory framework for authorized installations, framework for declared installations o Applicable rules

BIBLIOGRAPHY

REQUIREMENTS

Heat transfer, fluid mechanics

IDENTIFICATION

Course code : E5BE9AN1
ECTS :

DURATION

Lectures :
Tutorial classes :
Labs :
Total :

Project :
Personnal work :

ASSESSMENT

2 Continuous Assessments + an average of homework assignments (grammar).
Several mock TOEIC tests.

TEACHING MATERIALS

Handouts and digital resources

LANGUAGE

English

CONTACT

Edel Lynch
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Modifié le : 3 août 2026

UE : Anglais

COURSE : English

SCOPE OF THE COURSE

OBJECTIVES

Deepen strategies for written comprehension, technical documents.
Structure and argue oral discourse : technical presentations and research on scientific topics.

COMPETENCE AND SKILLS

Written comprehension.
Oral expression.

PROGRAM

Pragmatic competence :
Interactive oral communication through appropriate tasks. - Continuous oral presentations.
Role-playing : Business English.
Sociolinguistic competence :
Formal register : Technical and scientific English.
Common register : American accent / TOEIC.
Linguistic competence :
Vocabulary : Business English : announcements, weather, corporate life, IT.
Phonology : Auditory discrimination : Mastering homophones, similar sounds.
Grammar : Verb group : hypotheses, agreement, causatives, gerunds or infinitives.
Noun group : articles, agreements, adverbs, linking words, common pitfalls.

BIBLIOGRAPHY

Online Cambridge/Oxford Dictionary.
English news/press topics : BBC News.
TOEIC past papers.
The British Council : English for business and work.

REQUIREMENTS

Level B2

IDENTIFICATION

Course code : E5BE9CB1
ECTS : 2.5

DURATION

Lectures : 4
Tutorial classes : 12
Labs : 16
Total : 32

Project :
Personnal work :

ASSESSMENT

The requested work involves designing a positive-energy building. Deliverables include an environmental and architectural report, which will be the subject of an oral presentation. The final grade comprises : - Environmental report + oral presentation : coefficient 2/3. - POE lab work grade : coefficient 1/3.

TEACHING MATERIALS

PowerPoint presentations

LANGUAGE

English

CONTACT

François GARDE
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Modifié le : 3 août 2026

UE : Conception

COURSE : NetZEB, POE, Sustainable design

SCOPE OF THE COURSE

OBJECTIVES

The objectives of this course are :
To design a positive-energy building in a tropical environment
To conduct an evaluation in occupied mode.

COMPETENCE AND SKILLS

To be able to design a bioclimatic positive-energy building with energy sobriety and renewable energy production objectives.
To be able to perform an energy and environmental assessment of positive-energy buildings during the design phase.
To be able to conduct an occupied-mode evaluation of buildings (assessment of energy performance and thermal comfort).

PROGRAM

NET ZERO ENERGY BUILDINGS :

- Definition. Presentation of key documents and indicators : Energy Building Performance Directive, Mismatch factor. Review of primary energy to final energy conversion coefficients. Study perimeter concept
- What design tools for Net ZEBs ?
- Architecture and Net ZEBs. What architectural evolutions and solutions to achieve zero energy ?
- Presentation of various positive-energy buildings worldwide.

POST OCCUPANCY EVALUATION :

- Presentation of various POE methods.
- Case studies of several existing buildings.

LAB WORK :

- Occupied-mode evaluation of a positive-energy building. Comfort questionnaires are completed by users. Concurrently, comfort conditions are measured in classrooms and offices.
- Monitoring of energy consumption and analysis of a positive-energy building by usage type.

BIBLIOGRAPHY

Garde F. et al (2017). Solution Sets for Net-Zero Energy Buildings : Feedback from 30 Buildings worldwide. Wiley and son. ISBN :9783433030721

REQUIREMENTS

- S6 - Heat transfer. Thermal load balance of a building. Comfort and design in a tropical environment. SketchUp.
- S8 - Software tools in energy simulation. Solar renewable energy.
- S9 - Software tools in energy simulation 2.

IDENTIFICATION

Course code : E5BE9CB2
ECTS : 2

DURATION

Lectures : 4
Tutorial classes : 12
Labs : 8
Total : 24

Project :
Personnal work :

ASSESSMENT

Lab report grade

TEACHING MATERIALS

Handout

LANGUAGE

English

CONTACT

Didier CALOGINE Lecturer : Valentin Delplanque
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Modifié le : 3 août 2026

UE : Conception

COURSE : Aerodynamics

SCOPE OF THE COURSE

OBJECTIVES

The goal is to study the aerodynamics of buildings to optimize architectural designs in climate-responsive urban planning.

COMPETENCE AND SKILLS

- Mastery of concepts in urban planning and aero-climatic architecture applied to thermal comfort in humid tropical environments,
- Understanding the mechanisms behind the development of natural ventilation in buildings, as well as physical simulation methods using turbulent wind tunnels for these phenomena.

PROGRAM

Pragmatic approach (linked to the course “Sustainable development in tropical environments”) • Review of fluid mechanics applied to wind and its effects • Methods for assessing natural ventilation • Physical simulation on scale models in a turbulent wind tunnel of wind effects on and around buildings • Architectural design for natural ventilation (individual and collective housing) • Case studies
Tutorials : Bioclimatic design of a construction project in a realistic situation (geographical site on a real location – climate adjustment – existing environment) Lab work : Study on scale models in a wind tunnel • Characteristics of the turbulent boundary layer • Study on scale models of aerodynamic parameters for natural ventilation : assessment of internal velocity fields and flow rates based on parameters such as “nearby environment” / “façade porosity” / “internal partitioning” / “orientation” / “roof architecture” / “special cases of depressurization shafts and scoops”

BIBLIOGRAPHY

REQUIREMENTS

Fluid mechanics course, thermal comfort in tropical environments course, numerical simulation methods

IDENTIFICATION

Course code : E5BE9CB3
ECTS : 1.5

DURATION

Lectures : 2
Tutorial classes : 2
Labs : 16
Total : 20

Project :
Personnal work :

ASSESSMENT

1 project note

TEACHING MATERIALS

Handouts and PowerPoint presentations

LANGUAGE

English

CONTACT

Mathieu DAVID
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Modifié le : 3 août 2026

UE : Conception

COURSE : Software Tools in Energy Simulation 2

SCOPE OF THE COURSE

OBJECTIVES

Natural Building Design in Natural and Mixed-Mode Ventilation

COMPETENCE AND SKILLS

After this course, students must be able to perform an energy simulation of a multizone building using the EnergyPlus calculation code. They must also be able to present the results obtained in a report, including regulatory or incentive aspects (label).

PROGRAM

0.0.1 Part I : Multizone Simulation and Natural Ventilation

- Multizone modeling (inter-zonal and simplifying assumptions)
- Review of parameters influencing mass transfers at openings
- Nodal models and natural ventilation models
- Modeling natural ventilation : from simple to detailed models
- Critical analysis of results

0.0.2 Part II : Simulation and Standards (Regulations and Labels)

- Complementarity between regulation and simulation
- Examples with the PERENE framework

0.0.3 Part III : Project

- Architectural optimization of a multizone building through application of a regulation or label
- Realistic simulation of user behavior and systems to obtain an estimated building consumption ratio
- Drafting of a study report

BIBLIOGRAPHY

Energy simulation in building design. J.A. Clarke. Second Edition, Butterworth-Heinemann, Oxford, 2001. EnergyPlus version 8 manual

REQUIREMENTS

Thermal transfers, modeling tools (initiation to EnergyPlus or equivalent)

IDENTIFICATION

Course code : E5BE9MS1
ECTS : 2

DURATION

Lectures : 5
Tutorial classes : 15
Labs : 0
Total : 20

Project :
Personnal work :

ASSESSMENT

Project grade

TEACHING MATERIALS

Handouts and PowerPoint presentations

LANGUAGE

English

CONTACT

Didier CALOGINE
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Modifié le : 3 août 2026

UE : Modélisation

COURSE : Modelling

SCOPE OF THE COURSE

OBJECTIVES

The aim is to introduce the main numerical methods used in computational software.

COMPETENCE AND SKILLS

Be able to identify transport equations. Be able to discretise and solve equations.

PROGRAM

Transport equations and their resolution. The finite difference method. The finite volume method. The finite element method. Introduction to CFD.

BIBLIOGRAPHY

Numerical Analysis and Optimization
Grégoire Allaire

REQUIREMENTS

— Scientific Computing CPI 1

IDENTIFICATION

Course code : E5BE9MS2
ECTS : 2

DURATION

Lectures : 4
Tutorial classes : 24
Labs : 0
Total : 28

Project :
Personnal work :

ASSESSMENT

Project report

TEACHING MATERIALS

PowerPoint presentation

LANGUAGE

English

CONTACT

Didier CALOGINE Instructor : Alain Turpin
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Modifié le : 3 août 2026

UE : Modélisation

COURSE : Finite Element Modeling of Structures

SCOPE OF THE COURSE

OBJECTIVES

The aim is to design structures using the "Robot" software.

COMPETENCE AND SKILLS

Design and verification of all elements of a typical building structure using the Robot software.

PROGRAM

The first part (8 hours) will cover the concept of the finite element method : from the basic concept to a practical example.

The second part (20 hours) will focus on using the RSA and CBS (Concrete Building Structures) software.

A range of structural problems will be addressed, emphasizing the essential information required for calculation operations : • Model : two-dimensional (2D) and three-dimensional (3D) ; • Structure : structural element modules (column, beam, slab, isolated footing) before addressing load-bearing building structures ; • Load cases : static (point, uniform, and surface) and dynamic (rolling load on a bridge).

BIBLIOGRAPHY

REQUIREMENTS

Courses on static and hyperstatic structural mechanics. Courses on reinforced concrete, metal, and timber structures.

IDENTIFICATION

Course code : E5BE9MS3
ECTS : 1

DURATION

Lectures : 4
Tutorial classes : 12
Labs : 0
Total : 16

Project :
Personnal work :

ASSESSMENT

Project grade

TEACHING MATERIALS

PowerPoint presentation

LANGUAGE

English

CONTACT

Didier CALOGINE Instructor : Pascal SIMONIN
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Modifié le : 3 août 2026

UE : Modélisation

COURSE : Seismic and Cyclonic Risk

SCOPE OF THE COURSE

OBJECTIVES

Identify seismic and cyclonic phenomena. Extract the data necessary for design. Understand dynamic calculations.

COMPETENCE AND SKILLS

Know the measures to be implemented. Master the design of building structures.

PROGRAM

- Seismicity : history, data for France
- Cyclones in Réunion
- Effects on structures
- Dynamic characterization of structures
- Oscillators
- Equation of motion
- Accelerographs and response spectra
- Soil behavior and induced effects (soil liquefaction, slope stability)
- Specific provisions for buildings (RC and steel frames)
- Pathology of structures under seismic loads

BIBLIOGRAPHY

REQUIREMENTS

IDENTIFICATION

Course code : E5BE9MO1
ECTS : 1.5

DURATION

Lectures : 4
Tutorial classes : 12
Labs :
Total : 16

Project :
Personnal work :

ASSESSMENT

Project report

TEACHING MATERIALS

PowerPoint presentation

LANGUAGE

English

CONTACT

Didier CALOGINE Instructor : Isabelle
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Modifié le : 3 août 2026

UE : Montage

COURSE : Real estate project structuring

SCOPE OF THE COURSE

OBJECTIVES

The objective is to study the structuring of a real estate project.

COMPETENCE AND SKILLS

Understand the criteria to consider when structuring a real estate project.

PROGRAM

Real estate prospecting. • Strategic orientations. • Criteria to consider when selecting a real estate project. • Financial structuring. • Program definition. • Consultation with a design project management team

BIBLIOGRAPHY

REQUIREMENTS

Project management

IDENTIFICATION

Course code : E5BE9M02
ECTS : 1.5

DURATION

Lectures : 8
Tutorial classes : 16
Labs : 8
Total : 32

Project :
Personnal work :

ASSESSMENT

Project report

TEACHING MATERIALS

PowerPoint presentation

LANGUAGE

English

CONTACT

Didier CALOGINE Lecturer : Jean Philippe Lignier
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Modifié le : 3 août 2026

UE : Montage

COURSE : Wealth Management

SCOPE OF THE COURSE

OBJECTIVES

The aim is to study asset management tools.

COMPETENCE AND SKILLS

Understand the systems and indicators to implement for monitoring a built as-set.

PROGRAM

Monitoring of collective solar hot water installations. - Types of collective ECS installations. - Monitoring indicators and dashboard. - Installation monitoring system. - Site visits.

- Energy management - Various energy management solutions. - Network architecture. - IRIIO modules. - Peripheral device management. - Dashboard management. - ECS, PV, water management, consumption monitoring applications.
- Application of infrared thermography to building diagnostics.

BIBLIOGRAPHY

REQUIREMENTS

Project Management

IDENTIFICATION

Course code : E5BE9PR1
ECTS :

DURATION

Lectures :
Tutorial classes :
Labs :
Total :

Project :
Personnal work :

ASSESSMENT

Project grade

TEACHING MATERIALS

Digital support

LANGUAGE

English

CONTACT

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reunion.fr

Modifié le : 3 août 2026

UE : Projet

COURSE : Final Year Project

SCOPE OF THE COURSE

OBJECTIVES

The aim is to develop collaborative work.

COMPETENCE AND SKILLS

• Group work (at least 2 students) • Project management • Writing a study report • Oral presentation

PROGRAM

Carry out group work on a topic defined and supervised by a company with study needs in the fields of building and energy. • Group work (at least 2 students) • Project management • Writing a study report • Oral presentation

BIBLIOGRAPHY

REQUIREMENTS

IDENTIFICATION

Course code : E5BE9ER1
ECTS : 2.5

DURATION

Lectures : 6
Tutorial classes : 18
Labs :
Total : 24

Project :
Personnal work :

ASSESSMENT

- In-class assignments - Homework assignments

TEACHING MATERIALS

- Course and tutorial handouts - Past exam papers - In-house calculation tools

LANGUAGE

English

CONTACT

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Modifié le : 3 août 2026

UE : Énergies

COURSE : Renewable Energies (excluding solar)

SCOPE OF THE COURSE

OBJECTIVES

Master all means of production and conversion of renewable energy.

COMPETENCE AND SKILLS

Master all means of production and conversion of renewable energy.

PROGRAM

- Energy mix and the share of renewables
- Electricity production from hydropower
 - Operating principles and technologies
 - Characteristics and sizing
 - Regulatory aspects
- Electricity production from wind energy
 - Operating principles and technologies
 - Characteristics and sizing
 - Regulatory aspects
- Ocean thermal energy conversion
 - SWAC (Sea Water Air Conditioning) : Principles and example from Réunion
 - Electricity production from OTEC : principles and Réunion example
- Wave energy systems : Principles, conversion, storage and example from Réunion
- Geothermal energy, Canadian and Provençal wells.

BIBLIOGRAPHY

- Gérard Sarlos, Pierre-André Haldi, Pierre Verstraete. *Systèmes énergétiques* (Traité de Génie Civil volume 21). EAN13 : 9782880744649
- Francis Meunier. *Les énergies renouvelables*. EAN13 : 9782846703031
- *Le livre blanc des énergies renouvelables*. Syndicat des énergies renouvelables

REQUIREMENTS

- Thermodynamics
- Fluid mechanics
- Heat transfer

IDENTIFICATION

Course code : E5BE9ER2
ECTS : 2.5

DURATION

Lectures : 6
Tutorial classes : 18
Labs : 8
Total : 32

Project :
Personnal work :

ASSESSMENT

Lab Report

TEACHING MATERIALS

Handout and PowerPoint Presentation

LANGUAGE

English

CONTACT

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Modifié le : 3 août 2026

UE : Énergies

COURSE : Waste Management and Valorization (2
lab sessions)

SCOPE OF THE COURSE

OBJECTIVES

The objective is to understand the operation of treatment and recovery systems for biomass-type waste.

COMPETENCE AND SKILLS

Mastery of the scientific, technical, and environmental aspects related to systems for processing and valorizing biomass-type waste.

PROGRAM

Nature of biomass • Biomass typology • Biomass characterization • Biomass structure

Biomass treatment processes • Physicochemical treatment (Coagulation, flocculation, decantation) • Biological treatment (carbon, nitrogen and phosphorus treatment) • Reverse osmosis

Biomass energy recovery processes • Biochemical processes :
◦ Aerobic and anaerobic digestion : processes and sizing
◦ Fermentation : processes and sizing
• Thermochemical processes
◦ Combustion / incineration : processes and sizing
◦ Gasification : processes and sizing
◦ Pyrolysis

BIBLIOGRAPHY

R. Moletta, 2008, Anaerobic digestion, Edition Lavoisier, pp532 OTV, Traiter et valoriser les boues, ISBN 2-9511059-0-8, 2001. Biomass gasification and pyrolysis : practical design and theory / Prabir Basu. ISBN 978-0-12-374988-8, 2010

REQUIREMENTS

Notions of Chemistry and Biochemistry

IDENTIFICATION

Course code : E5TC10L1
ECTS : 10

DURATION

Lectures : 0
Tutorial classes : 0
Labs : 0
Total : 0

Project :
Personnal work :

ASSESSMENT

TEACHING MATERIALS

LANGUAGE

English

CONTACT

Didier CALOGINE
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Modifié le : 3 août 2026

UE : Stages

COURSE : English-speaking internship

SCOPE OF THE COURSE

OBJECTIVES

COMPETENCE AND SKILLS

PROGRAM

BIBLIOGRAPHY

REQUIREMENTS

IDENTIFICATION

Course code : E5TC10L2
ECTS : 20

DURATION

Lectures : 0
Tutorial classes : 0
Labs : 0
Total : 0

Project :
Personnal work :

ASSESSMENT

TEACHING MATERIALS

LANGUAGE

English

CONTACT

Didier CALOGINE
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Modifié le : 3 août 2026

UE : Stages

COURSE : Final-year internship

SCOPE OF THE COURSE

OBJECTIVES

COMPETENCE AND SKILLS

PROGRAM

BIBLIOGRAPHY

REQUIREMENTS