Major	Energy Engineering		
Master's programme	ELECTRICAL ENERGY FOR SUSTAINABLE DEVELOPMENT		
Master's Code	E2SD		
Qualification awarded	**Master's degree in Energy Engineering**		
Programme director	**Christophe GIRAUD-AUDINE (christophe.giraud-audine@ensam.eu)**		
Mode of study	*Level of qualification*	*Field of study*	*Language of study*
Full time	**Master ISCED 7**	**Engineering ISCED-F-07**	**English**
ECTS	*Campus*	*Length of programme*	*Specific arrangements for recognition of prior learning*
60	**ENSAM - Campus Lille & Université de Lille**	**1 year (from September to September)**	**Yes (VAE or VAP)**
Keywords	**Electrical Engineering, Renewable Electric Energy Production and Storage - Power Electronics - Electric Energy Distribution - Smart Grids- Modelling and Control of Multi-sources Systems – Numerical and Optimization methods - High Reliability Electric Motors for Transportation**		

Admission requirements

Type	Level	Way
French proficiency	**Level B2**	**Certificate**
English proficiency	**Level B2**	**Certificate**
Previous degree	**First-year of Master's (M1) minimum, or equivalent, in Engineering**	**Certificate of achievement**

Applicants interested in the E2SD programme must follow the online procedure and adhere to the schedule.

https://artsetmetiers.fr/en/formation/master-admissions

Overall objectives

The objectives of this one year program are to provide students with a deeper understanding of the electrical renewable energy and the challenges to integrate them in the future electric distribution systems.

- The content of the master is therefore to give to the student the essential tools to address the current issues, but also the knowledge of the state of the art research in the field in order to propose innovative solutions.

Programme learning goals

The table below details the abilities to be acquired and the expected proficiency levels according to the following grading scale:

abilities	*Expected abilities*	*Expected proficiency level*
		R&D
Disciplinary knowledge and reasoning	**1.1 Knowledge of underlying mathematics and science**	**4**
	1.2 Core fundamental knowledge of engineering	**4**
	1.3 Advanced engineering fundamental knowledge, methods and tools	**3**
Personal and professional skills attributes	**2.1 Analytical reasoning and problem solving**	**4**
	2.2 Experimentation, investigation and knowledge discovery	**4**
	2.3 System thinking	**4**
	2.4 Ethics, though and learning	**4**
	2.5 Ethics, equity and other responsibilities	**3**
Interpersonal skills: Teamwork and communication	**3.1 Teamwork**	**2**
	3.2 Communications	**4**
	3.3 Communications in foreign language	**2**
Conceiving, Designing, implementing, operating, innovating and entrepreneurship in the context of Corporate Social Responsibility	**4.1 External, societal and environmental context**	**3**
	4.2 Enterprise and business context	**3**
	4.3 Conceiving, systems engineering and management	**4**
	4.4 Designing	**4**
	4.5 Implementing	**4**
	4.6 Operating	**3**
	4.7 Leading engineering endeavours	**1**
	4.8 Engineering entrepreneurship	**1**

More specifically, the **key strengths** of the E2SD programme are as follows:

Programme structure

The E2SD programme is a one-year Master programme that spreads on two semesters

- **First semester (S3): From September to January**
  This first part of the program aims at giving students the necessary knowledge the main field of the electrical engineering. The main methods to model and design are addressed from the component up to the system and its control. Emphasis is also put on the general methodologies that are necessary to structure and organize the modeling and simulate complex system involving multi physical phenomenon at different timescales. All along the teaching, theoretical teaching is supported by practice session and workshops.
- **Second semester (S4): From February to September**

The second semester is focused on projects. Either a research project (which covers 100 hours of the teaching period for 10 ECTS; the research project is evaluated on the basis of a written report and a defense in front of teacher jury in mid February.) Or a professional training (200h).

Code	Title	Sem.	Year	ECTS	Hours	Compulsory/ Optional	Teaching modalities
UE1	English and Communication	S3	M2	5	50	Compulsory	Course/exercise/project
UE2	Energy Conversion	S3	M2	5	50	Compulsory	Course/exercise/project
UE3	Electromagnetic Conversion and Eco-design	S3	M2	5	50	Compulsory	Course/exercise/project
UE4	Option1: Electrical Transportation Option 2: Renewable Energy	S3	M2	5	50	Optional	Course/exercise/project
UE5	Bibliographic project	S3	M2	5	50	Compulsory	Project
UE6	Sustainable Development Applications	S3	M2	5	50	Compulsory	Course/exercise/project
UE7	Scientific project	S4	M2	10	100	Compulsory	Project
UE8	Professional Training	S4	M2	5	50	Compulsory	Project

Table 1 : Detail of the modules of the E2SD programme over the two semesters.

Study and assessment rules

Each module can be evaluated by means of practical works, projects, reports, oral presentations, exams and the assessment rules are explained at the beginning of the programme. Each module is evaluated between 0 and 20.

Formative and summative assessments are used. At the end of each instructional unit, student learnings are evaluated by marks composed of numeric values from 0 to 20.

Details are given by the head of the master at the beginning of the teaching. A booklet is given at the beginning of the first semester summing up the courses and the examination regulations.

Retake exams are organized at the beginning of the second semester.

Graduation requirements

To be graduated, students need to comply with the following rules:

Master 2

- Semester 1 : Validation of units for 30 ECTS each unit is validated if the mark is greater or equal to 10/20
- Semester 2 : Validation of internship (individual project) for 20 ECTS and the scientific project for 10 ECTS

Careers of graduates and access to further studies

Depending on their results and professional expectations, graduate students can continue their professional careers as a:

- Careers in industry: transportation, energy, production, mechatronic, aerospace
- Positions: R&D, project manager, consultant, researcher, head of R&D department
- Careers in academia: researcher or professor in France or abroad.