Major	Energy Engineering		
Master's programme	MECHANICS AND ENERGY IN NAVAL ENGINEERING		
Master's Code	M2EN		
Qualification awarded	**Master's degree in Naval Engineering**		
Programme director	**Prof. Patrick BOT (patrick.bot@ecole-navale.fr)**		
Mode of study	*Level of qualification*	*Field of study*	*Language of study*
Full time	**Master ISCED 7**	**Engineering ISCED-F-07**	**French**
ECTS	*Campus*	*Length of programme*	*Specific arrangements for recognition of prior learning*
60	**Ecole Navale, Lanvéoc-Poulmic**	**1 year (from Septem-ber to September)**	**No**
Keywords	**Naval Engineering, Marine Energy, Yachts, Propulsion, Hydrodynamics, Fluid Structure Interaction, Maritime Shipping, Underwater Acoustics, Signal Pro-cessing**		

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 equiv-alent, in Engineering**	**Approved by the admis-sion jury**

Applicants interested in the M2EN programme must follow the online procedure and adhere to the sched-ule.

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

Overall objectives

The M2EN programme objective is to educate high-level students and prepare them to research and devel-opment in the marine and yachting sectors.

- The aim of the programme is to provide the students advanced knowledge and tools needed for Research and development activities applied to the naval and yacht engineering sector and maritime environment in general.

Programme learning goals

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

1) To have experienced or been exposed to the current and future challenges for marine engineering and naval hydrodynamics
2) To be able to participate in and contribute to develop a transversal approach coupling design, simulation, performance prediction, in the scope of the Ship of the Future.
3) To be able to understand, explain and manipulate the concepts, methods, models and tools for marine engineering and energy conversion at sea.
4) To be skilled in the practice or implementation of methods, models and tools i) to optimize the design of naval platforms, ii) to simulate their behaviour.
5) To be able to lead or innovate in the scope of the modern maritime sector and within a multi-disciplinary industrial environment.

Sets of expected 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	**4**
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	**3**
	2.4 Ethics, though and learning	**4**
	2.5 Ethics, equity and other responsibilities	**4**
Interpersonal skills: Teamwork and communication	**3.1 Teamwork**	**4**
	3.2 Communications	**4**
	3.3 Communications in foreign language	**3**
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	**3**
	4.4 Designing	**4**
	4.5 Implementing	**3**
	4.6 Operating	**3**
	4.7 Leading engineering endeavours	**4**
	4.8 Engineering entrepreneurship	**3**

More specifically, the **key strengths** of the M2EN programme are as follows:

- Deeply embedded in the Naval Academy Research Institute, participation to the research projects

- Familiarization with advanced experimental facilities in hydrodynamics
- Research training through a research project and writing of a scientific article
- Extensive network in the naval and yacht industry.

Programme structure

Learning outcomes are reached through a well-balanced training program that combines projects, theoretical and practical learning sequences, during which students experience different methods and tools, in order to develop multiple and transversal skills.

The M2EN programme is a one-year Master programme that spreads on two semesters

- **First semester (S3): From September to February**
  This semester is made of 3 major modules in hydrodynamics totalizing 14 ECTS, a research training module including 1 long research project and valorisation courses, and 3 minor opening modules.
- **Second semester (S4): From March to September**
  The second semester is dedicated to the Master project of 6 months and 30 ECTS. The internship will be made in a research laboratory or a company R&D service, in France or abroad.

Code	Title	Sem.	Year	ECTS	Hours	Compulsory/ Optional	Teaching modalities
AB1	Research training and valorisation	S3	M2	10	130	Compulsory	Project/Course
A1	Physical Hydrodynamics	S3	M2	5	86	Compulsory	Course/Exercises/Projects/lab
A2	Applied Naval Hydrodynamics	S3	M2	6	90	Compulsory	Course/Exercises/Projects/lab
A3	Computational Hydrodynamics	S3	M2	1.5	26	Compulsory	Course/Exercises/Projects/lab
A4	Energy conversion / Marine renewable energies	S3	M2	1.5	25	Compulsory	Course/Exercises/Project
B1	Observation of the marine environment	S3	M2	5	90	Compulsory	Course/Exercises/Project
LV	Scientific English	S3	M2	1	24	Compulsory	Course/Project
MT	Internship (Master thesis)	S4	M2	30	5/6 months	Compulsory	Internship

Table 1 : Detail of the modules of the M2EN 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.

- For all modules the final mark must be ≥ 10.
- 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

- Validate 30 ECTS during the first semester
- Validate 30 ECTS during the second semester

Careers of graduates and access to further studies

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

- PhD student in a field related to the maritime and yachting sectors, in academia or in industry (CIFRE), to become a recognized expert in an area of naval engineering
- R&D engineer/researcher in large companies, SMEs or start-ups, in numerous fields (design, construction, services, consultancy, etc.) in an area of the maritime and yacht industry.
- Pursue a naval architecture specialisation programme (e.g. DPEA) to become top-level naval architects.