



<b>Major</b>	<b>Industrial Engineering</b>		
<b>Master's programme</b>	<b>INNOVATION DESIGN ENGINEERING INNOVATION DESIGN</b>		
<b>Master's Code</b>	<b>ICI - IC</b>		
<b>Qualification awarded</b>	<b>Master's degree in Industrial Engineering</b>		
<b>Programme director</b>	<b>Prof. Améziane AOUSSAT (ameziane.aoussat@ensam.eu) Dr Fabrice MANTELET (fabrice.mantelet@ensam.eu)</b>		
<b>Mode of study</b>	<i>Level of qualification</i>	<i>Field of study</i>	<i>Language of study</i>
<b>Full time</b>	<b>Master ISCED 7</b>	<b>Engineering ISCED-F-07</b>	<b>French</b>
<i>ECTS</i>	<i>Campus</i>	<i>Length of programme</i>	<i>Specific arrangements for recognition of prior learning</i>
<b>60</b>	<b>Paris</b>	<b>1 year (from September to September)</b>	<b>Yes (VAE or VAP)</b>
<i>Keywords</i>	<b>Design Methodology, Design Process, Innovation, User experience, PLM, Industry 4.0, Virtual Reality, Risk Analysis, Digital Mock-Up, Reverse Engineering, Rapid Prototyping, Creativity.</b>		

## Admission requirements

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

Applicants interested in the ICI - IC programme must follow the online procedure and adhere to the schedule.

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

## Overall objectives

- Contribute to theoretical and methodological reflections on innovative design and design engineering.
- Carry out methodological research to optimize the design process (application to industrial projects).
- Raise awareness of multidisciplinary and collaborative work in design (multidisciplinary teaching and promotion Engineers, Designers, Ergonomists).



## 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 design innovation process.
- 2) To be able to participate in and contribute to develop a transversal approach coupling design, ergonomic and engineering in the scope of Industrial needs.
- 3) To be able to understand, explain and manipulate the concepts, methods, models and tools for design process
- 4) To be skilled in the practice or implementation of methods, models and tools to optimize the design process.
- 5) To be able to lead or innovate in the scope of design new products paradigm and within a multi-disciplinary industrial environment

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

More specifically, the **key strengths** of the ICI - IC programme are as follows:

- Deep theoretical knowledge on the mainstream concepts, methods, models and tools involved in design of new products process;
- Extended practical skills for the definition of multi-disciplinary technical solutions for design process;
- Deep understanding of the overall value chain, the strategic with a particular focus on upstream phase of the product design process;
- Structured research methodology to be used as a template to address a wide range of Design process related research challenges;
- Transversal adaptation, integration, analysis, critical thinking, self-learning, communication, valorisation and organizational skills gained when confronting to both academic and industrial multi-disciplinary projects;
- International exposure through exchanges with other foreign students.

### Programme structure

Learning outcomes are reached through a well-balanced training program that combines theoretical and practical learning sequences, during which students are placed in both academic and real-life industrial configurations, in order to develop multiple transversal skills.

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

- o **First semester (S3): From September to February**  
This semester is composed of 5 scientific modules, 1 language module, 1 long research project, for a total of 30 ECTS.
- o **Second semester (S4): From March to September**  
The second semester is dedicated to the Master thesis of 6 months and 30 ECTS. The internship will be made in a research structure (laboratory or company) in France or abroad.

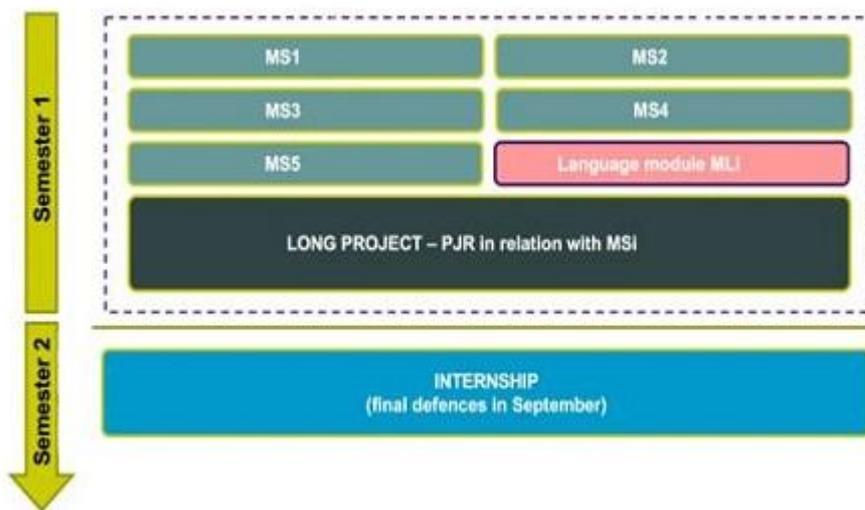


Figure 1 : Structure of the ICI - IC programme.

Code	Title	Sem.	Year	ECTS	Hours	Compulsory/Optional	Teaching modalities
MS1	Fundamentals of the Design Process	S3	M2	5	33	Compulsory	Course/Exercises/Project
MS2	Product Design Methodology	S3	M2	5	27	Compulsory	Course/Exercises/Project



Code	Title	Sem.	Year	ECTS	Hours	Compulsory/Optional	Teaching modalities
MS3	Integration of Design Fields	S3	M2	5	33	Compulsory	Course/Exercises/Project
MS4	Management of Innovative Processes	S3	M2	5	30	Compulsory	Course/Exercises/Project
MS5	Integration of Design and Ergonomics	S3	M2	4	33	Compulsory	Course/Exercises/Project
ML1	Advanced technical English	S3	M2	2	20	Compulsory	Course/Exercises/Project
PRJ	Research project	S3	M2	4	6 weeks	Compulsory	Long project
MTI	Master thesis	S4	M2	30	NA	Compulsory	Internship

Table 1 : Detail of the modules of the ICI - IC 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 language modules (MLi):

- The final mark language module must be  $\geq 10$ , and there is no compensation between the modules.

For scientific modules (MSi):

- The final mark of each scientific module must be  $\geq 8$ ;
- The average of the 6 scientific modules must be  $\geq 10$ , thus there can be compensation between the scientific modules.

For long research project (PJR):

- The final mark of the PJR must be  $\geq 10$ .

For master thesis (MTI):

- The final mark of the master thesis must be  $\geq 10$ .

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.

At the end of the ICI-IC programme, the final average is calculated based on the ECTS distribution, and honours are awarded (very good, good, fair, satisfactory).

## 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 design and innovation methodology, in academia or in industry (CIFRE), to become a recognized expert in an area of the design process;
- R&D engineer/researcher in large companies or start-ups, in numerous sectors (manufacturing, construction, services, consultancy, etc.) and fields (automotive, aerospace, health, IoT, etc.) in an area of design of new products and services.