Major	Industrial Engineering		
Master's programme	MANAGEMENT OF 3D INTERACTIVE TECHNOLOGIES		
Master's Code	MTI3D-IVI M1		
Qualification awarded	**Master's degree in Industrial Engineering**		
Programme director	**Dr. Olivier CHRISTMANN (olivier.christmann@ensam.eu)**		
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	**Angers**	**1 year (from September to September)**	**Yes (VAE or VAP)**
Keywords	**Virtual Reality, Augmented Reality, Mixed Reality, Programming, Real-time computer graphics, User experience, 3D modelling, Rendering, Texturing, Management, Agile development, Rapid prototyping, CAD, 3D printing.**		

Admission requirements

Type	Level	Way
English proficiency	**Level B2**	**Certificate**
Previous degree	**Bachelor's degree, minimum, or equivalent, in Engineering**	**Certificate of achievement**

Applicants interested in the MTI3D-IVI M1 programme must follow the online procedure and adhere to the schedule.

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

Overall objectives

The MTI3D-IVI 1st year programme aims to prepare students for the Master 2 programme by giving them a solid technical foundation in programming, 3D modelling, augmented and virtual reality, and project management.

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 acquire knowledge in programming and engineering sciences
2) To acquire a solid background in 3D modelling, 3D real-time programming and augmented/ virtual reality
3) To be able to design and prototype interactive interfaces
4) To be able to take part in the development of a complete project from 3D modelling to programming in several areas (industry, health, training, design support, simulation, ...)
5) To acquire management skills to lead multidisciplinary teams

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 MTI3D-IVI M1 programme are as follows:

- Practical skills in the complete production pipeline of virtual and augmented reality applications
- Transversal adaptation, integration, analysis, critical thinking, self-learning, communication, valorisation and organizational skills gained when confronting to both academic and industrial multi-disciplinary projects

Programme structure

Learning outcomes are reached through a well-balanced training programme 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 MTI3D-IVI programme is a one-year Master programme that spreads on two semesters

- **First year (Master 1)**
    - **First semester (S1): From September to May**
      This semester is composed of 3 technical modules (414h), 1 management module (102h), 3 project modules including a long project of 276h, for a total of 50 ECTS.
    - **Second semester (S2): From May to September**
      The second semester is dedicated to an internship (2 to 5 months) for 10 ECTS. The internship will take place in a research structure (laboratory or company) in France or abroad.

Code	Title	Sem.	Year	ECTS	Hours	Compulsory/ Optional	Teaching modalities
MT1	Programming	S1	M1	10	138	Compulsory	Course/Exercises/Project
MT2	Engineering Sciences	S1	M1	8	66	Compulsory	Course/Exercises/Project
MT3	Augmented and Virtual Reality	S1	M1	16	222	Compulsory	Course/Exercises/Project
33	Management and Innovation	S1	M1	8	102	Compulsory	Course/Exercises/Project
PJR	Long project	S1	M1	6	180	Compulsory	Project
PJ1	Innovation Challenge	S1	M1	1	36	Compulsory	Project
PJ2	Virtual Reality Challenge	S1	M1	1	60	Compulsory	Project
INT	Internship	S2	M1	10	N/A	Compulsory	Internship

Table 1 : Detail of the modules of the MTI3D-IVI M1 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 technical and management modules (MTi, MM

- The final mark of each module must be ≥ 10, and there is no compensation between the modules

For project (PJi and PJR)

- The average of the 3 MTi modules must be ≥ 10, thus there can be compensation between modules.

For master thesis (INT)

- The final mark of the internship 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 1

- Validate 50 ECTS during the first semester
- Validate 10 ECTS during the second semester
- At the end of the MTI3D-IVI 1st year programme, the final average is calculated based on the ECTS distribution, and mentions are awarded (very good, good, fair, passable).

Careers of graduates and access to further studies

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

- The validation of this training gives access by right to the second year of the programme MTI3D-IVI.