

Master's Degree
Instrumentation, Measurement, Metrology (IMM)

Track (2nd year):

Instrumentation and Measurement Science for Major Nuclear Research Facilities
(IMSci-Nu)

Contact persons:

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Units	ECTS	Modules	Hours	Total
Fundamentals in nuclear fission and fusion	6	Nuclear Physics	14	42
		Radiation-Matter Interactions	7	
		Nuclear fission and fusion reactions	7	
		Plasma, material damage, heat transfer	14	
Major nuclear facilities and challenges	6	Tokamaks	7	49
		ITER and DEMO	7	
		Research reactors and MTR, JHR	7	
		Nuclear Power Plants, SMRs/AMRs	7	
		Reactor operating principle and control system	7	
		Reactor and tokamak experiments including TBM (Tritium breeding)	7	
		Other installations: accelerators, generators, ...	7	
Nuclear detection, instrumentation and fusion diagnostics	12	Radiation detection	7	84
		Identification of sources of uncertainty	14	
		Non-destructive testing methods	14	
		Nuclear heating rate measurement	7	
		Principle of radioprotection	7	
		Measurements and instrumentation under severe thermo-hydraulic conditions	10.5	
		Instrumentation for dismantling and remediation	10.5	
		Extreme constraints for tokamak measurement systems	7	
		Thermal diagnostics for tokamaks	7	
Modeling and experimental work	6	Particle transport modeling (course)	7	59.5
		Particle transport modelling (practical)	7	
		Thermal and fluid modeling (course)	3.5	
		Thermal and fluid modeling (practical)	7	
		Practical work on major nuclear facilities (remote, 3D)	21	
		Hands-on activities on detectors, sensors and characterization devices	14	
Total S1	30			234.5
Interculturality, international communication and scientific seminars	6	(Inter)cultural Intelligence	3.5	49
		Cultural Patterns & Variability (communicating effectively in the global workplace)	3.5	
		Communication Strategies for Intercultural Teamwork	3.5	
		Designing and Delivering Effective Sponsor Talks	3.5	
		Global Writers-Global Readers	3.5	
		Less is More (style and substance in writing up research)	1.75	
		Strategic Communication	1.75	
		Scientific seminar series (school, remote, in-person)	28	
Research project	6	Research project with bibliographical, experimental and numerical activities	42	42
Professionalization and Internship	18	Remote and in-person visits (major instruments in France and abroad, laboratories)	14	14
		4 to 6 month internship on international facilities with thesis and oral presentation		
Total S2	30			105
TOTAL M2	60			339.5