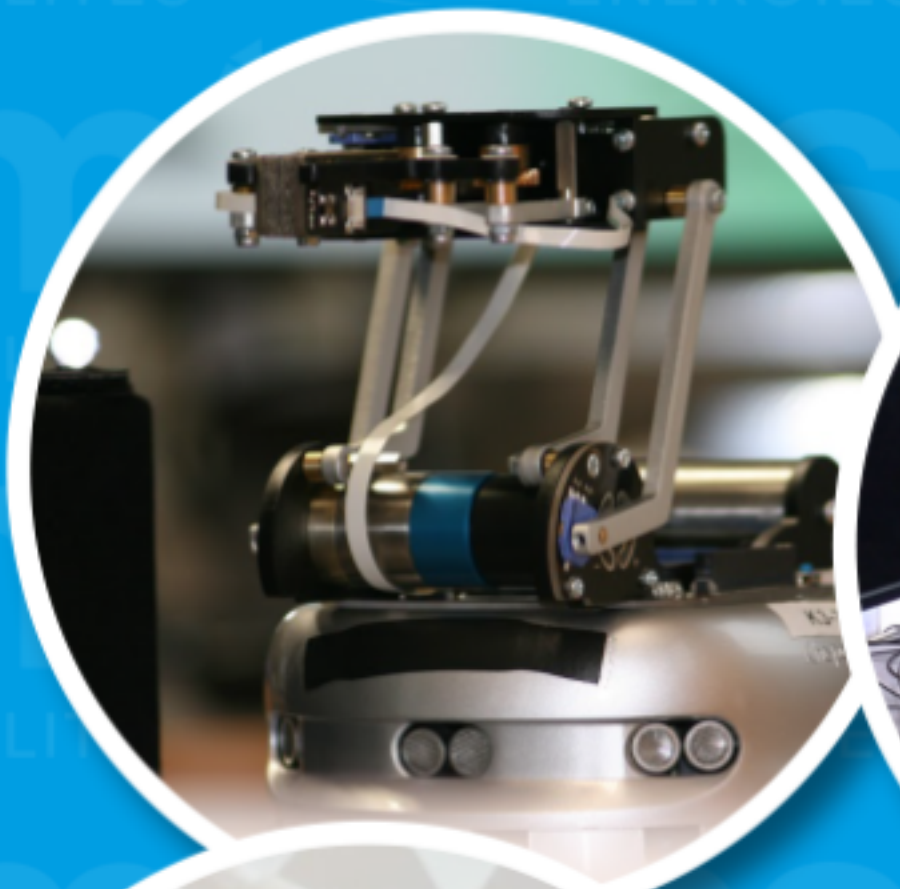
SYLLABUS

DIGITAL SYSTEMS TRAINING

LORRAINE INP Ensem

ÉCOLE D'INGÉNIEURS CRÉÉE EN 1900



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DIGITAL SYSTEMS TRAINING AT ENSEM

ENSEM trains engineers in research , design and development projects in fields such as systems control and management, safety and security of critical systems, digital modeling and simulation, software and embedded services or even signal or image processing.

The first two years of studies are organized around a core curriculum. They aim at making students gain basic scientific skills in applied mathematics (scientific calculation, numerical analysis) in computer science (algorithms and programming, databases, networks) in automatic control (systems control, dependability) and in signal and image processing.

The scientific program is completed by general training (foreign languages, communication, management, systems engineering)

Job opportunities are guaranteed by internships in companies and numerous industrial conferences. Students are encouraged to gain an international outlook through various possibilities of academic exchanges and internships abroad.

The 3rd year of studies is a specialization year organized around :

- One semester of academic training ; several study paths can be followed, some of which leading to a double degree.
- A 6-month internship in a company or a laboratory.

550 engineering students

150 graduates each year

8000 graduates to date

6000 active alumni

52 professors

200 researchers or students

18000 m² teaching and research facilities

+than 60 partnerships with international Universities

Semester 5 courses

CM = Lecture TD = Tutorial TP = Lab work Barre UE = Pass Grade

Course ref	Course name	CM	TD	TP	Hours	Coeff.	ECTS	Barre UE	More info
5KSSNN02	**ENSEM Digital Systems DEGREE Semester 5**								
5KUSNN08	**EU Mathematics 1**								
5KESNN81	Mathematics for Engineering	20	20	0	**40**	3,3	**5**	10	
5KESNN12	Complex Analysis	10	10	0	**20**	1,7			
5KUSNN09	**UE Signals, Systems and Electrical Circuits**								
5KESNN91	Signal and System Modeling	24	8	8	**40**	3,2	**5**	10	
5KESNN22	Electrical Circuits and Applications	9	4	10	**23**	1,8			
5KUSNN02	**EU Modeling of Physical Systems**								
5KESNN21	Analytical Modeling in Mechanics and Electricity	20	20	0	**40**	4	**5**	10	
5KESNN41	Link Graph-Based Modeling	5	2	0	**7**	1			
5KUSNN10	**EU Information Science 1**								
5KESNN0A	Algorithms and Programming	7	5	18	**30**	2,2	**5**	10	
5KESNN42	Discrete Mathematics	22	18	0	**40**	2,8			
5KUSNN05	**EU Languages 1**								
5KESNN51	English	0	24	0	**24**	2,5	**5**	10	
5KESNN52	2nd Foreign Language	0	24	0	**24**	2,5			
5KESNN53	Validation of French language level	0	1	0	**1**	Quitus			
5KUSNN06	**EU General Education 1**								
5KESNN62	Business Management	14	0	0	**14**	1,5	**5**	10	
5KESNN64	Electrical Accreditation	8	0	0	**8**	Quitus			
5KESNN63	Communication	0	16	0	**16**	1,5			
5KESNN65	Project management	4	16	0	**20**	2			
5KESNN61	1st year Project	0	0	30	**30**	Quitus			
				TOTAL	**377**		**30**		

Semester 6 courses

CM = Lecture TD = Tutorial TP = Lab work Barre UE = Pass Grade

Course ref	Course name	CM	TD	TP	Hours	Coeff.	ECTS	Barre UE	More info
6KSSNN02	**ENSEM Digital Systems DEGREE Semester 6**								
6KUSNN01	**EU Mathematics 2**								
5KESNN13	Probabilities	16	10	6	**32**	2	**5**	10	
6KESNN11	Numerical Analysis	20	20	0	**40**	3			
6KUSNN09	**EU Automatic Control, Thermodynamics and Simulation**								
6KESNN12	Thermodynamics & Kinematics (CATIA)	14	4	12	**30**	2,2	**5**	10	
6KESNN21	Practical Work in Automatic Control	0	0	10	**10**	0,6			
6KESNN91	Automatic Control- System Control and Dynamics	14	7	9	**30**	2,2			
6KUSNN04	**EU Engineering Development**								
6KESNN22	Engineering Development for Robotic Control	0	0	50	**50**	5	**5**	12	
6KUSNN10	**EU Computer Science**								
6KESNN0A	Algorithms & Object Oriented Programming	7	5	18	**30**	1,8	**5**	10	
6KESNN32	Databases	7	4	9	**20**	1,4			
6KESNN33	Algorithms, Data Structures, and Communicating Applications	10	5	15	**30**	1,8			
6KUSNN05	**EU Languages 2**								
6KESNN51	English	0	30	0	**24**	2,5	**5**	10	
6KESNN52	2nd Foreign Language 2	0	20	0	**24**	2,5			
6KESNN53	Validation of French language level	0	1	0	**1**	Quitus			
6KUSNN06	**EU General Education 2**								
6KESNN64	Business management	12	6	0	**18**	2	**5**	12	
6KESNN66	Innovation and Entrepreneurship	0	12	0	**12**	Quitus			
6KESNN65	Electrical Accredidation and work safety	0	0	0,5	**0.5**	Quitus			
6KESNN63	Communication	2	10	0	**12**	1			
6KESNN62	1st year project	0	0	20	**20**	2			
6KUSNN08	**EU Industrial Internship 1**								
6KESNN81	Industrial Internship	1 mois				–	Quitus		
					TOTAL	**371,5**		**30**	

Semester 7 courses

CM = Lecture TD = Tutorial TP = Lab work Barre UE = Pass Grade

Course ref	Course name	CM	TD	TP	Hours	Coeff.	ECTS	Barre UE	More info
7KPSNN03	**ENSEM Digital Systems DEGREE Semester 7**								
7KUSNN14	**EU Tools for Mathematics and Physics**								
7KESNN4A	PDE Analysis	12	16	0	**28**	2,5	**5**	10	
7KESNN52	Macroscopic Equations for Classical Physics	18	18	0	**36**	2,5			
7KUSNN11	**EU Optimization / DES**								
7KESNN1A	Modeling of Discrete Events Systems	16	6	8	**30**	2,6	**5**	10	
7KESNN61	Petri Nets Applications	0	0	8	**8**	0,6			
9KEPLN45	Static Optimization	8	12	0	**20**	1,8			
7KUSNN16	**EU Automatic control and data analysis**								
7KESNN71	Non Linear Systems and Systems Robustness	20	6	8	**34**	2,5	**5**	10	
7KESNN72	Dynamic Optimization	8	12	0	**20**	1,25			
7KESNN73	Data Analysis	8	8	0	**16**	1,25			
7KUSNN15	**EU Computer Science**								
7KESNN5A	Software Analysis and Design	22	6	16	**44**	3,5	**5**	10	
7KESNN82	Algorithms and Complexity	10	10	0	**20**	1,5			
7KUSNN12	**EU Signal Processing**								
7KESNN2A	Digital Systems Design	6	4	20	**30**	2,2	**5**	10	
7KESNN2B	Signal Processing	22	12	6	**40**	2,8			
7KUSNN17	**EU General Education 3**								
7KESNN7A	Scientific culture in the field of Information Science	10	0	0	**10**	Quitus	**5**	10	
7KESNN7B	Professional Communication	8	2	0	**10**	0,75			
7KESNN7C	Account Management	10	10	0	**20**	1,25			
7KESNN7D	English	0	24	0	**24**	1,5			
7KESNN7E	2nd Foreign Language	0	24	0	**24**	1,5			
					TOTAL	**390**		**30**	

Semester 8 courses

CM = Lecture TD = Tutorial TP = Lab work Barre UE = Pass Grade

Course ref	Course name	CM	TD	TP	Hours	Coeff.	ECTS	Barre UE	More info
8KPSNN05	**ENSEM Digital Systems DEGREE Semester 8**								
8KUSNN10	**EU Applied Mathematics**								
8KESNN0A	Numerical Analysis for Mechanics	8	8	24	**40**	3,5	**5**	10	
8KESNN51	Statistics	12	0	10	**22**	1,5			
8KUSNN11	**EU Information Transmission**								
8KESNN1A	Information Transmission	18	2	12	**30**	2,8	**5**	10	
8KESNN1B	Machine Learning	8	8	0	**16**	1,4			
8KESNN53	Complements in Information Transmission	0	0	8	**8**	0,8			
8KUSNN12	**EU Automatic Control**								
8KESNN2A	Digital Control	10	8	12	**30**	2,7	**5**	10	
8KESNN2B	System Identification	10	0	10	**20**	1,8			
8KESNN61	Advanced Regulation	0	0	6	**6**	0,5			
8KUSNN14	**EU Computer Science**								
8KESNN78	Twizzy Project	0	0	30	**30**	1,8	**5**	10	
8KUSNN72	Computer Systems and Networks	20	0	16	**36**	3,2			
8KUSNN13	**EU Safety**								
8KESNN3A	System dependability	18	2	10	**30**	2,5	**5**	10	
8KESNN3B	Formal Checking & model-checking	2	0	8	**10**	1			
8KESNN71	Systems Engineering	8	12	0	**20**	1,5			
8KUSNN09	**EU General Education 4**								
8KESNN96	Conferences : scientific culture in Information Science	15	0	0	**15**	Quitus	**5**	10	
8KESNN93	Marketing Strategy and Business Simulation Game	6	24	0	**30**	2			
8KESNN91	English	0	24	0	**24**	1,5			
8KESNN92	2nd Foreign Language 4	0	24	0	**24**	1,5			
	TOTAL				**391**		**30**		

Semester 9 courses

CM = Lecture TD = Tutorial TP = Lab work Barre UE = Pass Grade

Course ref	Course name	CM	TD	TP	Hours	Coeff.	ECTS	Barre UE	Plus d'infos
9KPSNN08	**ENSEM Digital Systems DEGREE Semester 9**								
9KUISN06	**EU System Control**								
9KEISN11	Applications for aerospace	8	8	0	**16**	1,7	**5**	10	⊕
9KEISN61	UAV Control	8	8	0	**16**	1,6			
9KEISN14	Multi-agent system management	8	8	0	**16**	1,7			
9KUISN02	**EU Signal and Image Processing**								
9KEISN23	Multi-dimension signal processing	12	4	0	**16**	1,25	**5**	10	⊕
9KEISN24	Images compression and encryption	12	4	0	**16**	1,25			
9KEISN21	Statistic modeling	16	0	0	**16**	1,25			
9KEISN22	Biomedical signals and systems	16	0	0	**16**	1,25			
9KUISN03	**EU Monitoring and dependability**								
9KEISN32	Monitoring and diagnostics	12	4	0	**16**	1,7	**5**	10	⊕
9KEISN31	Advanced methods in System dependability	5	0	11	**16**	1,7			
9KEISN33	Signal detection, extraction and reconstruction	8	0	8	**16**	1,6			
9KUISN05	**EU Advanced Computer Science**								
9KEISN43	Blockchain and distributed algorithms	6	2	8	**16**	1,25	**5**	10	⊕
9KEISN44	Distributed Systems	8	2	6	**16**	1,25			
9KEISN51	Digital simulation and robotics	8	0	8	**16**	1,25			
9KEISN42	Geometrical modeling for Additive 3D manufacturing	6	0	10	**16**	1,25			
9KUISN09	**EU Engineering Development Lab Work/ End of Study Project**								
9KEISN92	Engineering Development or End of Study Project	0	0	60	**60**		**5**	12	⊕
9KUFGN11	**EU General Education 5**								
9KEISN71/72	Professional English or English Language Support (B2)	0	30	0	**30**	3	**5**	10	⊕
9KEISN91	Personal Development and Job-Search seminar	10	10	0	**20**	2			
9KEFGN66	Industrial Conferences	20	0	0	**20**	Quitus			
				TOTAL	**354**		**30**		

Semester 10 courses

CM = Lecture TD = Tutorial TP = Lab work Barre UE = Pass Grade

Course ref	Course name	CM	TD	TP	Hours	Coeff.	ECTS	Barre UE	More info
10KSSNN01	**ENSEM Digital Systems DEGREE Semester 10**								
0KSPNN05	**EU Engineering or R&D Internship**								
	Internship				6 mois	30	**30**	30	

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