

ECOLE NATIONALE SUPERIEURE
D'ELECTRICITE ET DE MECANIQUE
2, Avenue de la Forêt de Haye
54500 Vandoeuvre-lès-Nancy



Academic year 2025-2026
Synthetic curriculum 2025-2026 NRJ_FISE

Semester S5

Code	Course Unit	ECTS	Code	Course	Coeff	Teacher	Vol	CM	TD	TP
5JUPLN02	Tools for mathematics	5	5JEPLN20	Mathematics for engineers	0,6	A. Gueudin	32	16	16	0
			5JEPLN21	Numerical Analysis 1	0,4	?	20	8	6	6
5JUPLN01	Foundations of mechanics	5	5JEPLN10	continuum mechanics	0,5	C. Laurent	30	16	14	0
			5JEPLN11	Thermodynamics	0,5	G. Pernot	30	16	14	0
5JUPLN03	Electricity 1	5	5JEPLN30	Fundamentals of Electrical Engineering	0,5	F. Meibody	30	14	10	6
			5JEPLN31	Electrical Circuits and Applications	0,5	T. Boileau	30	12	10	8
5JUPLN04	Information and computer sciences 1	5	5JEPLN40	Modeling of signals and systems	0,4	V. Louis-Dorr	23	9	4	10
			5JEPLN41	Logical and discrete event systems	0,1	J.-F. Pétin	7	4	3	0
			5JEPLN42	Algorithms and programming	0,5	?	30	7	5	18
5JUPLN05	Languages 1	5	5JEPLN50	English	0,5	C. Corringier	24	0	24	0
			5JEPLN51	Modern languages 2	0,5	A. Quesada	24	0	24	0
			5JEPLN52	Validation of the French language clearance certificate	pass/fail A. Quesada		1	0	1	0
5JUPLN06	General Training 1	5	5JEPLN60	Business environment	0,3	F. Temsamani	20	14	6	0
			5JEPLN64	Electrical Accreditation and Health at Work	pass/fail T. Boileau		8	8	0	0
			5JEPLN68	CSR 1	pass/fail V. Louis-Dorr		11	2	9	0
			5JEPLN67	Industrial conferences	pass/fail P. Villette		6	6	0	0
			5JEPLN61	Communication	0,3	A. Thimon	16	0	16	0
			5JEPLN62	Project management	0,4	J.-C. Marpeau	18	2	16	0
			5JEPLN63	1st year project	pass/fail J.-C. Marpeau		30	0	0	30

Semester S6

Code	Course Unit	ECTS	Code	Course	Coeff	Teacher	Vol	CM	TD	TP
6JUPLN03	Tools for mathematics 2	5	6JEPLN30	Probability and Statistics	0,4	A. Gueudin	34	18	16	0
			6JEPLN31	Optimization & Graph	0,3	P. Riedinger	30	16	14	0
			6JEPLN32	Numerical Analysis 2	0,3	?	20	8	6	6
6JUPLN01	Applied Mechanics	5	6JUPLN10	Mechanics for the engineer	0,5	J.-F. Schmitt	30	14	8	8
			6JUPLN11	Fluid mechanics and applications	0,5	N. Rimbert	30	12	10	8
6JUPLN04	Electricity 2	5	6JEPLN40	Electrical machines	0,5	D. Netter	30	13	8	9
			6JEPLN41	Power electronics	0,5	L. Baghli	30	13	8	9
6JUPLN05	Information Sciences 2	5	6JEPLN50	Automatic - Dynamics and Control of Systems	0,5	J. Daafouz	30	14	7	9
			6JEPLN51	Algorithmics and Object-Oriented Programming	0,5	V. Chevrier	30	7	5	18
6JUPLN06	Languages 2	5	6JEPLN60	English	0,5	C. Corringier	24	0	24	0
			6JEPLN61	Modern Languages 2	0,5	A. Quesada	24	0	24	0
			6JEPLN62	Validation of the French language clearance certificate	pass/fail A. Quesada		1	0	1	0
6JUPLN07	General Training 2	5	6JEPLN72	Management	0,2	F. Temsamani	16	10	6	0
			6JEPLN73	Innovation and Entrepreneurship	0,2	F. Temsamani	12	0	12	0
			6JEPLN70	Electrical authorization and occupational health	pass/fail T. Boileau		0,5	0	0	0,5
			6JEPLN76	CSR 2	pass/fail C. Laurent		14	8	6	0
			6JEPLN71	Industrial conferences	pass/fail P. Villette		6	6	0	0
			6JEPLN74	Communication and professional integration	0,2	A. Thimon	14	2	12	0
			6JEPLN75	1st year project	0,4	J.-C. Marpeau	20	0	0	20

Semester S7

Code	Course Unit	ECTS	Code	Course	Coeff	Teacher	Vol	CM	TD	TP
7JUNRJ02	Tools for the engineer	4	7JENRJ20	Distributions	0,33	?	15	9	6	0
			?	Introduction to AI	0,33	?	15	9	6	0
			7JENRJ21	partial differential equations	0,33	?	15	9	6	0
7JUNRJ03	Energy conversion	5	7JENRJ30	Electromechanical conversion of energy	0,33	A. Labergue	24	8	4	12
			7JENRJ31	Energy chain conversion design office	0,33	M.Urbain	26	6	0	20
			7JENRJ32	Materials for energy	0,33	G. Pernot	20	8	12	0
7JUNRJ04	Mechanics	5	7JENRJ40	Introduction to heat transfers	0,5	S. Didierjean	30	8	12	10
			7JENRJ41	Mechanics of rotating machines	0,5	M.Bordron	30	16	10	4
7JUNRJ05	Electrical Engineering	5	7JENRJ50	Power Electronics	0,5	S. Pierfederici	30	16	6	8
			7JENRJ51	Electrical machines	0,5	N. Takorabet	30	10	8	12
7JUNRJ06	Information Sciences 3	5	7JENRJ06	Signal processing	0,5	D. Wolf	30	18	8	4
			7JENRJ61	Sensor networks	0,5	?	30	10	5	15
7JUNRJ01	General training 3	6	7JENRJ14	CSR 3	pass/fail B. Remy		14	10	4	0
			7JENRJ15	Industrial conferences	pass/fail P. Villette		6	6	0	0
			7JENRJ10	Communication and professional integration	0,1429	F. Temsamani	14	6	8	0
			7JENRJ11	Accounting Management	0,2857	J. Binet	18	6	12	0
			7JENRJ12	English	0,2857	C. Corringier	24	0	24	0
			7JENRJ13	Living Language 2	0,2857	A. Quesada	24	0	24	0

Semester S8										
Code	Course Unit	ECTS	Code	Course	Coeff	Teacher	Vol	CM	TD	TP
8JUNRJ01	General Training 4	6	8JENRJ10	English	0,25	C. Corringer	24	0	24	0
			8JENRJ11	Modern Languages 2	0,25	A. Quesada	24	0	24	0
			8JENRJ13	CSR	0,25	F. Tamsamani	14	8	6	0
			8JENRJ14	Industrial Conferences - Research Day	pass/fail	B. Remy	12	12	0	0
			8JENRJ12	Marketing Strategy & Business Simulation	0,25	J.-C. Marpeau	21	3	18	0
8JUNRJ02	8-01 General Knowledge of Networks, Sources and Storage Elements	6	8JENRJ20	Electrical Network Modeling	0,2	S. Dufour	16	8	4	4
			8JENRJ21	Integration of renewable energies	0,2	J.-P. Martin	16	10	2	4
			8JENRJ22	Characteristics of energy sources and storage elements	0,2	A. Labergue	18	18	0	0
			8JENRJ23	Heat networks	0,2	B. Remy	14	6	4	4
			8JENRJ24	Case study	0,2	M.Urbain	16	0	0	16
8JUNRJ03	8-02 Dynamic Modeling and Electrical Machine Drives	6	8JENRJ30	Modeling and control of electrical machines	0,5	F. Meibody	40	20	12	8
			8JENRJ31	Electrical machines connected to the network - failures and transien	0,5	N. Takorabet	40	16	8	16
8JUNRJ04	8-03 Advanced Power Electronics for Sationary and Embedded applications	6	8JENRJ40	Current and emerging power supply structures	0,5	S. Pierfederici	40	20	8	12
			8JENRJ41	Digital integration	0,5	J.-P. Martin	40	8	0	32
8JUNRJ08	8-04 Energy Transfer and Conversion	6	8JENRJ80	Thermodynamics of energy systems	0,5	S. Didierjean	40	10	20	10
			8JENRJ81	Heat and mass transfer	0,38	A. Labergue	30	10	8	12
			8JENRJ82	Fluid energy conversion	0,12	O. Caballina	10	6	4	0
8JUNRJ05	8-05 Fluid Mechanics for the Engineer	6	8JENRJ50	Turbulence	0,25	O. Caballina	20	12	8	0
			8JENRJ51	Aerodynamic	0,25	A. Pereira	20	12	8	0
			8JENRJ52	Fluid-structure interactions	0,25	N. Louvet	20	12	8	0
			8JENRJ53	Case study	0,25	N. Louvet	20	2	0	18
8JUNRJ06	8-06 Design and dimensioning of solids and structures	6	8JENRJ60	Computer Aided Design	0,25	M.Bordron	30	0	0	30
			8JENRJ61	Life cycle analysis	0,25	M. Bordron	10	6	4	0
			8JENRJ62	Manufacturing technologies and processes	0,25	M. Bordron	20	10	2	8
			8JENRJ63	Sizing case studies	0,25	J.-F. Schmitt	20	2	0	18
8JUNRJ07	8-07 Safety and Cybersecurity	6	8JENRJ72	Cryptography, Cybersecurity of industrial systems	0,25	? / J. Daafouz	20	8	4	8
			8JENRJ73	Distributed Systems, Web Services and Blockchain	0,25	V. Chevrier	20	8	0	12
			8JENRJ70	Analysis and evaluation of discrete event systems performance	0,25	J.-F. Pétin	20	8	4	8
			8JENRJ71	Operational Safety	0,25	N. Brinzei	20	10	4	6
8JUNRJ09	8-08 Signals, Data and the IoT	6	8JENRJ90	Signal processing and data transmission	0,38	V. Louis-Dorr	30	16	6	8
			8JENRJ91	Databases	0,38	YQ Song	30	10	8	12
			8JENRJ92	Implementing an Internet of Things application	0,25	?	20	2	0	18
8JUNRJ10	8-09 Stability, Control and Digital Integration	6	8JENR101	Numerical control	0,25	J. Daafouz	20	10	4	6
			8JENR102	Stability and stabilization of systems	0,25	R. Postoyan	18	10	4	4
			8JENR103	Digital integration with microcontrollers	0,25	?	20	8	0	12
			8JENR104	Smart grid application	0,25	J. Daafouz	20	4	4	12
8JUNRJ11	8-10 Artificial Intelligence, Data Analysis and Machine Learning	6	8JENR110	Introduction to Pattern Recognition	0,25	S. Le Cam	24	12	12	0
			8JENR111	Kernel methods - Support vector machines	0,25	M.Kallas-Edelson	12	6	6	0
			8JENR112	Neural networks	0,25	M.Kallas-Edelson	12	6	6	0
			8JENR113	Design office	0,25	S. Le Cam	32	0	0	32
8JUNRJ12	8-11 Numerical Modeling and Simulation in Electrical Engineering	6	8JENR120	Analytical and digital BF electromagnetism	0,5	J. Fontchastagner	40	16	8	16
			8JENR121	Simulations of electromagnetic devices	0,5	C.-H. Bonnard	40	4	0	36
8JUNRJ13	8-12 Numerical Modeling and Simulation in Thermal, Fluid and Solid Mechanics	6	8JENR130	Introduction to numerical simulation in Mechanics & Thermal Engine	0,33	B. Remy	28	8	0	20
			8JENR131	Digital CAD Tools - Fluid Mechanics - Thermal	0,33	N. Rimbert	26	6	0	20
			8JENR132	Finite element analysis of machines & structures	0,33	C. Laurent	26	6	0	20
8JUNRJ14	8-H2 Hydrogen Track: From Production to Energy Applications	6	8JENR140	H2 electrochemical systems	0,5	G. Sdanghi	42	42	0	0
			8JENR141	Practical work & Case study	0,5	M.Hinaje	38	0	0	38
8JUNRJ15	8-Nuclear-1 Nuclear Training – Core Curriculum	6	8JE47N27	Fundamentals of Nuclear Energy (FST)	0,25	X. Caron	20	20	0	0
			8JE47N28	Upstream and downstream nuclear fuel cycle (FST)	0,25	JS Kroll-Rabotin	18	18	0	0
			8JENR150	Digital Methods & Tools	0,5	N. Rimbert	42	6	0	36
8JUNRJ16	8-Nuclear-2 Nuclear Training - Mechanics & Energy	6	8JENR160	Thermo-Hydraulics	0,25	A. Labergue	20	10	4	6
			8JENR161	Turbulence (nuclear formation)	0,25	O. Caballina	20	12	8	0
			8JENR162	Heat networks & thermodynamic systems	0,25	B. Remy	20	6	6	8
			8JENR163	Multiphysical behavior of materials, stress corrosion cracking	0,25	JF. Ganghoffer	20	16	4	0
8JUNRJ17	8-Nuclear-3 Nuclear Training - Electrical Engineering	6	8JENR170	Transient regimes of synchronous alternators	0,25	N. Takorabet	20	8	4	8
			8JENR171	Modeling of electrical networks	0,25	S. Dufour	20	8	4	8
			8JENR172	Modeling and control of electrical machines	0,5	F. Meibody-Tabar	40	20	12	8
8JUNRJ18	8-Nuclear-4 Nuclear Training - Information Sciences	6	8JENR180	Cryptography, Cybersecurity of industrial systems	0,25	?	20	8	4	8
			8JENR181	Operational safety (nuclear training)	0,25	N. Brinzei	20	10	4	6
			8JENR182	Numerical control (nuclear training)	0,25	J. Daafouz	20	8	4	8
			8JENR183	Stability and stabilization of systems (nuclear training)	0,25	R. Postoyan	20	12	4	4
Projects (foreign students)		25	Projects (foreign students)		1	S. Gallaire				

Semester S9

Code	Course Unit	ECTS	Code	Course	Coeff	Teacher	Vol	CM	TD	TP
9KUFGN06	General Training 5	5	9KEFGN61	Bank English	0,5	C. Corringier	24		24	0
			9KEFGN64	Professional integration	0,5	F. Temsamani	30	15	15	0
			9KEFGN65	Energy research	pass/fail	B. Remy	20	20	0	0
			9KEFGN67	Validation of international experience	pass/fail	S. Gallaire	1	0	1	0
9KUFGN15	Project	5	9KEFGN51	Academic R&D Project - Industrial R&D Project	0,6	J.-C. Perrin	60	0	0	60
			9KEFGN52	Cross-functional design office	0,4	T. Boileau / V. Louis-Dorr	30	0	0	30
9KUNRJ09	9_1 Risk analysis and monitoring of energy systems	5	9KENRJ91	Risk analysis and functional security	0,5	N. Brinzei	30	18	4	8
			9KENRJ92	Monitoring and Diagnosis	0,5	S. Maza	30	20	10	0
9KUNRJ11	9_2 Modeling and Analysis of Electromechanical Systems using Data-Based Approach	5	9KENRJ10	Inverse problems, Decompositions, Parsimony	0,33	R. Ranta	20	10	10	0
			9KENRJ11	Pattern identification and reduction	0,33	M.Giaccagli	20	12	8	0
			9KENRJ12	Design offices	0,33	M. Giaccagli / R. Ranta	20	0	0	20
9KUNRJ27	9_3 Event Control and Reinforcement Learning	5	9KENR270	Event Control	0,33	R. Postoyan	20	8	4	8
			9KENR271	Optimal Control and Reinforcement Learning	0,33	J. Daafouz	20	8	4	8
			9KENR272	Design offices	0,33	J. Daafouz / R. Postoyan	20	0	0	20
9KUNRJ28	9_4 Control of energy and transport systems	5	9KENR280	Control over the challenges of transport and conversion	0,5	J. Kreiss	30	0	30	0
			9KENR281	Nuclear control and Component-based automation	0,5	J.-F. Pétin	30	6	2	22
9KUNRJ13	9_5 Autonomous and on-board electrical networks	5	9KENRJ30	Electrical energy quality - Static and dynamic stability	0,5	S. Pierfederici	30	14	0	16
			9KENRJ31	Energy management in microgrids	0,5	J.-P. Martin	30	16	2	12
9KUNRJ29	9_6 Electrical Machines (modeling & design)	5	9KENR290	Analytical modeling and optimization of electrical machines	0,5	D. Netter	30	0	0	30
			9KENR291	Optimization and design of electrical machines	0,5	N. Takorabet	30	16	2	12
9KUNRJ15	9_7 Electromechanical Conversion with High-Availability	5	9KENRJ50	High Availability Electromechanical Conversion - Part 1	0,5	F. Meibody	30	22	0	8
			9KENRJ51	High Availability Electromechanical Conversion - Part 2	0,5	T. Boileau	30	14	0	16
9KUNRJ16	9_8 ETNP components in their environment	5	9KENRJ60	Power semiconductor components	0,5	St. Rael	30	22	0	8
			9KENRJ61	Electromagnetic compatibility	0,5	M.Urbain	30	14	0	16
9KUNRJ17	9_9 Electrical storage systems	5	9KENRJ70	Electrochemical storage of electrical energy	0,5	M.Hinaje	30	18	0	12
			9KENRJ71	Interface power electronics converters	0,5	S. Pierfederici	30	14	0	16
9KUNRJ18	9_10 “Power-Hardware-In-The-Loop” (P-HIL)	5	9KENRJ80	P-HIL - tools and techniques	0,5	E. Jamshidpour	30	10	0	20
			9KENRJ81	P-HIL Project	0,5	C.-H. Bonnard	30	0	10	20
?	9_11 Advanced Fluid Mechanics	5	?	High-speed flows and combustion conversion	?	F. Lemoine	25	25	0	0
			?	Multiphase flows and interfaces	?	N. Rimbert	20	14	0	6
			?	Turbulence modeling	?	O. Caballina	15	10	0	5
?	9_12 Heat and mass transfer	5	?	Heat exchangers and waste heat recovery	0,33	N. Rimbert	20	20	0	0
			?	Flow in complex media	0,33	N. Louvet	20	20	0	0
			?	Heat transfers at interfaces and participating media	0,33	B. Remy	20	20	0	0
?	9_13 Simulate, measure and visualize	5	?	Methodology for characterizing	0,33	A. Labergue	20	20	0	0
			?	Experimental characterization	0,33	G. Pernot	20	0	0	20
			?	Numerical simulations and applications	0,33	O. Caballina	20	0	0	20
?	9_14 Materials Science and Behavior	5	?	Materials Science	0,33	M.Bordron	20	8	4	8
			?	Mechanical behavior of materials	0,67	C. Laurent	40	14	6	20
?	9_15 Nuclear	5	?	Nuclear and Society (SHJEJS)	0,33	?	14	14	0	0
			?	Design and operation of nuclear installations	0,33	?	28	28	0	0
			?	Advanced study	0,33	?	18	18	0	0
9KUETR06	Projects (foreign students)	25	9KUETR60	Projects (foreign students)	1	S. Gallaire				

Semester S10

Code	Course Unit	ECTS	Code	Course	Coeff	Teacher	Vol	CM	TD	TP
OKSTAG01	Engineering or R&D Internship	30	OKSTAGE3	Engineering Internship	1					