



## Academic year 2019-20 - ESILV year 4 courses in English

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Year 4 FALL semester (semester 7) Computer Science, Big Data, Connected Objects (IBO)		Exchange students must select at least 19 ECTS				
Learning Unit	ECTS	Coef	Course name	Course hours	Mandatory (13 ECTS)	optional
<b>ADVANCED PROGRAMMING METHODS</b>	6	3.0	Cloud & virtualization techniques	27.00	X	
		3.0	Advanced Database Management	27.00		X
<b>DATA PROCESSING</b>	6	3.0	Machine Learning	27.00	X	
		3.0	Advanced Data Structures & Algorithms	27.00	X	
<b>LANGUAGES</b>	4	4.0	French for foreigners		X	
		0.0	English <small>Dpt SS</small>	18.00		X
<b>PROJECTS</b>	9	9.0	Projet PI <sup>2</sup>	.		X
<b>SOFT SKILLS</b>	2	2.0	Elective Week	18.00		X
<b>SOFTWARE ENGINEERING</b>	6	3.0	Java EE & frameworks	27.00		X
		3.0	Design Pattern & Software Development Process	27.00		X
<b>Max. ECTS</b>	<b>33</b>					

Year 4 SPRING semester (semester 8) Computer Science, Big Data, Connected Objects (IBO)

Exchange students must select at least 19 ECTS

Learning Unit	ECTS	Elective	Coef	Course name	Course hours	Mandatory (13 ECTS)	optional
DATA & IA Mer, Jeu, Ven	6	X	3.0	Chatbot and recommendation systems	27.00	X	
			3.0	Web datamining & semantics	27.00	X	
<b>OR</b>							
IOT Mer, Jeu, Ven	6	X	3.0	LoraWan Academy	15.00	X	
			3.0	Mobile application development	27.00	X	
MACHINE LEARNING Mer, Jeu, Ven	3		3.0	Neural Networks and Deep Learning	27.00		X
ADVANCED IT Lun, Mar	6		3.0	Advanced topics in NoSql databases	27.00	X	
			3.0	Web Application Architectures	27.00		X
PROJECT Lun, Mar	9 or 15		9.0	Short project (from January to end of March)	.		X
			15.0	Long project (from January to end of April)			X
SOFT SKILLS Lun, Mar	4		4.0	French for foreigners		X	
			0.0	English <small>Dpt SS</small>	15.00		X
Max. ECTS	<b>34</b>						

Year 4 FALL semester (semester 7) New Energies (NE)			Exchange students should select at least 19 ECTS			
Learning Unit	ECTS	Coef	Course name	Course hours	Mandatory (13 ECTS)	optional
<b>DIGITAL</b>	6	3.0	Embedded systems: data acquisition	27.00	X	
		3.0	Operational research: graph theory	27.00		X
<b>PHYSICS</b>	6	1.5	Hydrogen production and utilization	18.00	X	
		1.5	Advanced fluid mechanics	21.00	X	
		3.0	Renewable energies	36.00	X	
<b>LANGUAGES</b>	4	4.0	French for foreigners		X	
		0.0	English <small>Dpt SS</small>	18.00		X
<b>PROJECT</b>	9	9.0	Projet PI <sup>2</sup>	.		X
<b>SOFT SKILLS</b>	2	2.0	Elective Week	18.00		X
<b>TRANSITION</b>	6	3.0	Smart metering and energy efficiency	36.00		X
		3.0	Sustainable development	36.00		X
<b>Max. ECTS</b>	<b>33</b>					

**Year 4 SPRING semester (semester 8)  
New Energies (NE)**

Exchange students should select at least 19 ECTS

Learning Unit	ECTS	Coef	Course name	Course hours	Mandatory (13 ECTS)	Optional
DIGITAL Mer, Jeu, Ven	3	3.0	Network for Smart City	15.00		X
PHYSICS Mer, Jeu, Ven	6	3.0	Advanced computational fluid dynamics	27.00	X	
		3.0	Renewable energies	36.00	X	
DIGITAL Lun, Mar	3	3.0	Data analytics	27.00		X
PROJECT Lun, Mar	9 or 15	9.0	Short project (from January to end of March)	200.00		X
		<b>OR</b>				
		15.0	Long project (from January to end of April)			X
SOFT SKILLS Lun, Mar	4	4.0	French for foreigners		X	
		0.0	English <small>Dpt SS</small>	15.00		X
TRANSITION Lun, Mar	3	1.5	Energy Law	18.00	X	
		1.5	Power Grid	18.00	X	
Max. ECTS	<b>34</b>					

Year 4 FALL semester (semester 7) Computational Mechanics and Modeling (MNM)		Exchange students should select at least 19 ECTS				
Learning Unit	ECTS	Coef	Course name	Course hours	Mandatory (13 ECTS)	optional
<b>MECHANICAL ENGINEERING</b>	3	3.0	Structural Analysis	27.00	x	
<b>NUMERICAL ENGINEERING</b>	6	1.5	Structural optimization	15.00		x
		3.0	Finite Element Method (FEM)	27.00	x	
		1.5	Finite Volume Method (FVM)	15.00		x
<b>SYSTEMS ENGINEERING</b>	3	3.0	Automatic and control	27.00		x
<b>MECHANICAL ENGINEERING</b>	3	1.5	Fluid Mechanics	21.00		x
		1.5	Powertrain systems	19.50		x
<b>SYSTEMS ENGINEERING</b>	3	3.0	Mechatronics Fundamentals	27.00	x	
<b>LANGUAGES</b>	4	4.0	French for foreigners		x	
		0.0	English <small>Dpt SS</small>	18.00		x
<b>PROJECT</b>	9	9.0	Projet PI <sup>2</sup>	.		x
<b>SOFT SKILLS</b>	2	2.0	Elective Week	18.00		x
<b>Max. ECTS</b>	<b>33</b>					

Year 4 SPRING semester (semester 8)  
Computational Mechanics and Modeling  
(MNM)

Exchange students should select at least 19 ECTS

Learning Unit	ECTS	Coef	Course name	Course hours	Mandatory (13 ECTS)	optional
MECHANICAL ENGINEERING Mer, Jeu, Ven	6	3.0	Non linear structural analysis	27.00	X	
		3.0	Mechanical vibrations	27.00	X	
PROCESSUS INDUSTRIELS Mer, Jeu, Ven	3	3.0	Industrial systems	27.00		X
MECHANICAL ENGINEERING Lun, Mar	3	1.5	Computational Fluid Dynamics (CFD)	18.00		X
		1.5	Probabilistic Mechanic and Reliability	18.00		X
PROJECT Lun, Mar	9 or 15	9.0	Short project (from January to end of March)	200.00		X
		<b>OR</b>				
PROJECT Lun, Mar	9 or 15	15.0	Long project (from January to end of April)			X
SOFT SKILLS Lun, Mar	4	4.0	French for foreigners		X	
		0.0	English <small>Dpt SS</small>	15.00		X
SYSTEM ENGINEERING Lun, Mar	3	3.0	Practical Robotics and Mechatronic	27.00	X	
Max. ECTS	<b>34</b>					

Year 4 FALL semester (semester 7)  
Engineering (IF) Financial

Exchange students should select at least 19 ECTS

Learning Unit	ECTS	Coef	Course name	Course hours
FINANCIAL MARKETS Mer, Jeu, Ven	6	1.5	Foundations of Insurance	21.00
		1.5	Cryptocurrencies Market	21.00
		3.0	Financial Concepts	39.00
MATHEMATICS FOR FINANCE Mer, Jeu, Ven	6	3.0	Advanced Probability	36.00
		3.0	Machine Learning	27.00
PROGRAMMING LANGUAGE FOR FINANCE Lun, Mar	6	2.5	VBA and .Net for Finance	33.00
		2.5	C++ for Finance	27.00
		1.0	Version Control	15.00
LANGUAGES Lun, Mar	4	4.0	French for foreigners	
		0.0	English <small>Dpt SS</small>	18.00
PROJECT Lun, Mar	9	9.0	Projet PI <sup>2</sup>	.
SOFT SKILLS Lun, Mar	2	2.0	Elective Week	18.00
Max. ECTS	<b>33</b>			



Year 4 SPRING semester (semester 8)  
Financial Engineering (IF)

Exchange students should select at least 19 ECTS

Learning Unit	ECTS	Elective	Coef	Course name	Course hours	Mandatory (13 ECTS)	optional
FINANCE QUANTITATIVE Mer, Jeu, Ven	9	X	3.0	Stochastic Calculus	33.00	X	
			1.5	Investment management	21.00	X	
			1.5	Market risk	21.00	X	
			1.5	Econometrics	12.00	X	
			1.5	Equity Derivatives	21.00	X	
<b>OR</b>							
FINTECH Mer, Jeu, Ven	9	X	3.0	Blockchain programming	36.00	X	
			1.5	NoSQL databases	15.00	X	
			3.0	Cryptography	33.00	X	
			1.5	Web Development	15.00	X	
<b>OR</b>							
SCIENCES ACTUARIALES Mer, Jeu, Ven	9	X	3.0	Actuarial mathematics	33.00	X	
			1.5	ALM	18.00	X	
			1.5	Life Insurance	18.00	X	
			3.0	Stochastic Calculus	33.00	X	
IT POUR LA FINANCE Lun, Mar	6		3.0	Programming Bloomberg API with C#	30.00		X
			3.0	Machine Learning for Asset Management	30.00		
PROJECT Lun, Mar	9 or 15		9.0	Short project (from January to end of March)			X
			<b>OR</b>				
			15.0	Long project (from January to end of April)			X
SOFT SKILLS Lun, Mar	4		4.0	French for foreigners		X	
			0.0	English <small>Dpt SS</small>	15.00		X
Max. ECTS	<b>34</b>						